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CONTENTS

LOSS OF HUMAN LIFE FROM CONCEPTION TO AGE TWO

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and
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INTRODUCTION

There are several indicators for measuring loss of life in the early childhood ages such as abortion rate, still birth rate (SBR), perinatal mortality rate (PMR), infant mortality rate (IMR) and its two components - neonatal mortality rate (NMR) and post neonatal mortality rate (PNMR). All these rates are annual and the base generally in each case is the number of live births in the year under consideration. Hence, they are considered as sensitive indicators for measuring improvements in health conditions in developing countries. Most of the deaths contributing to these rates occur at various points of time after birth and now at least, the period covered by each indicator is standardised as a result of clear specifications from the WHO.

Early childhood loss of life in India and its states

In spite of strict specifications and their adoption by most countries, these rates are found to be inadequate for assessing the impact of development programmes and health interventions. For example, Table 1 shows the levels of IMR, NMR and PNMR in 1985 for 14 major states of India.

From columns (1), (4) and (5) of Table 1, it can be seen that Uttar Pradesh had the highest IMR of 141.6 in 1985; Rajasthan had an IMR of 108.2, and the all-India average was 97.2. However, all the three areas had comparable proportions of NMR in IMR at 61.65 per cent, 60.07 per cent and 61.83 per cent respectively. Similarly, Orissa, Maharashtra, Gujarat and Andhra Pradesh had very different IMRs in 1985, but had almost the same percentage of IMR accounted for by NMR, or its counterpart PNMR. The other interesting feature was that except for Kerala, Tamil Nadu and perhaps Andhra Pradesh, the proportion of IMR accounted for by NMR was not sufficiently high. With development, it is expected that IMR along with NMR and PNMR will fall and the share of NMR in IMR will be larger. This has not happened in the Indian states which are at different stages of social and economic development. For the sake of illustration, the entries in columns (1), (4) and (5) of

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TABLE 1

Infant mortality (IMR), neonatal mortality (NMR) and post neonatal mortality (PNMR) rates, India and 14 major States, 1985

	IMR	NMR	PNMR	% IMR accounted by	
				NMR	PNMR
INDIA	97.2	60.1	37.1	61.83	38.17
Andhra Pradesh	82.9	56.8	26.1	68.15	31.85
Bihar	105.5	61.8	43.7	58.58	41.42
Gujarat	97.9	66.0	31.9	67.42	32.58
Haryana	84.9	44.2	40.7	52.06	47.94
Karnataka	69.4	45.0	24.4	64.84	35.16
Kerala	31.3	22.1	9.2	70.61	29.39
Madhya Pradesh	122.5	67.7	54.8	55.27	44.73
Maharashtra	67.8	45.8	22.0	67.55	32.45
Orissa	132.0	88.9	43.1	67.35	32.65
Punjab	70.8	44.7	26.1	63.14	36.86
Rajasthan	108.2	65.0	43.2	60.07	39.93
Tamil Nadu	81.3	56.4	24.9	69.37	30.63
Uttar Pradesh	141.6	87.3	54.3	61.65	38.35
West Bengal	73.5	43.2	30.3	58.78	41.22

Source SRS Bulletin published by Registrar General of India.

Table 1, for the two states - Maharashtra and Orissa. These two states differ very much in terms of industrialisation, urbanisation, educated level of population etc. Yet the ratio of NMR to PNMR is at about 67 : 33 in spite of IMR at 68 and 132 infant deaths per 1000 live births in Maharashtra and Orissa respectively.

It is important to note that though infant mortality fell as a whole between 1974 and 1985, this was mainly in the postneonatal period (from 56 to 38 per 1000 live births) while neonatal mortality hardly changed from about 70 in urban areas. In the rural areas also it continued to be stable at a high level. Persistence of high neonatal mortality without much reduction has been demonstrated by many prospective studies in various parts of the country.

In the Vadu Budruk Rural Health project in Pune District, Maharashtra, India, which has been in operation since 1977 and where community participation is very strong, infant mortality fell from 118.4 in 1978 to 62.5 in 1985, the main fall being in postneonatal mortality rates. A special in-depth prospective study in this area was made from 1982-1985. This cohort study included both *de jure* and *de facto* births and infant deaths and it clearly showed that the velocity of fall in postneonatal mortality was 35 per cent as against a 3 per cent fall in neonatal mortality over the four year period.

It is now believed both by practicing obstetricians, pediatricians and social scientists that to bring about a sustained change in early childhood deaths maternal factors such as literacy, income, nutrition, age and parity at birth, low birth weight of the baby etc. play an important role. According to "Shram-

shakti" report prepared by the Self-Employed Women's Association[1] "a rural female in India gets pregnant about 6 to 8 times during her lifetime, spends about 16 years in pregnancies and lactation and gives birth to more than 6 children of which about 4 survive". Coyaji[2] has rightly pointed out the importance of 'M' (Mother) in the MCH Programme in India and under her guidance the K.E.M. Hospital, Pune has been paying more attention to survivorship of mothers and children rather than worrying only about the levels of mortality.

Two possible measures of child survivorship

Due to these reasons and the fact that IMR does not fully cover the crucial period(s) of a child's development, UNICEF and the Population Division of United Nations have recently recommended the use of U5MR, which is equal to deaths below age 5, per 1000 live births in a year. We believe U5MR also does not fully cover the important phases of a child's development. Two possible alternative measures can be as follows:

(a) Proportion of conceptions in a year resulting in a surviving child aged one year after about 1.75 to 2.75 years from the year of conception, and

(b) Proportion of conceptions in a year resulting in a surviving child aged two years after about 2.75 to 3.75 years after the year of conception.

Let us call (a) and (b) as PC(1), and PC(2). These two indicators will cover such important phases of a child's life as: antenatal care, attention at the time of delivery (birth injuries are considered to be a major cause of high perinatal mortality in India), breastfeeding practices, weaning and introduction of other food related practices, acute respiratory infections, diarrhoeal episodes, immunisation and their booster doses. In short, all the phases which determine whether the child will survive or die.

In both PC(1) and PC(2) the main difficulty is the detection of pregnancy in the earlier trimesters. But now in several developing countries the situation has improved considerably and pregnancies are being detected well before the woman becomes visibly pregnant. The other difficulty lies in the fact that the health staff have to follow the child till he/she is two years old. This is important as we are talking of survivors and not deaths. In several areas of India continuous health monitoring of the mother and child is under operation due to the efforts made by Indian Council of Medical Research (ICMR), the K.E.M. Group of Hospitals and other voluntary organisations. International agencies are publishing data on number of conceptions annually for a large number of countries. In the following paragraphs, we have used such data to assess the loss of life between pregnancy and a child surviving to ages one and two years.

Loss of life prior to age two years

Demographic Year Books regularly publish data on the number of live births, still births, legal medical termination of pregnancy (MTP), the age distribution of population and a large number of other population related variables. Another important source of data, particularly on MTP, is the Alan Guttmacher Institute in U.S.A. For India considerable information, at the state and national levels, is published by the Ministry of Health in its "Year Book", and by the Registrar General of India through its publications on the Sample Registration Scheme, now in operation in rural and urban areas countrywide.

These data sets have been used to compute the necessary statistics for 16 countries around 1985-1986. For Bulgaria, Czechoslovakia and Tunisia comparable data were available for only 1985 and 1981. Table 2 shows the relevant information.

Column 1 in the table shows the period for which the number of conceptions have been computed. The number of conceptions have been computed separately for those resulting in a surviving child aged one year and two years. Each conception will end in either a live birth or pregnancy wastage. The gestation period leading to a live birth has been assumed to be uniformly nine months in all the 16 countries. For pregnancy wastage due to abortion there can be two causes—Natural and self-induced. Self-induced pregnancy wastage again can be broken up into two components, namely, legal (MTP) and illegal. Information on the latter is rarely available.

Column 2 of Table 2 shows the total number of conceptions, columns 3, 4 and 5 show the components of conceptions, namely, live births, MTPs and still births respectively. As we do not have the number of spontaneous abortions and illegal abortions, the computed total number of conceptions is always smaller than its real value. Column 6 of Table 2 shows the number of surviving children aged one year or two years in the year indicated in brackets. Column 7, which is the ratio of column 6 to column 2 multiplied by 100, shows the percentage of conceptions resulting in a surviving child aged either one year or two years. Column 8 shows the ratio of MTP to 100 live births.

In column (6) of Table 2, the estimated number of children aged one year or two years refers to 1st January of the year shown in brackets; for India the reference point is 1st March 1986.

Column 7 of Table 2, shows the tremendous loss of life in most of the countries due to induced abortion. From column 8 it can be seen that in Cuba, Singapore, Denmark, Hungary, Bulgaria, Czechoslovakia and USA, induced abortions are the major cause of the reduced number of live births, and in some of the countries, the actual number of induced abortions is on the increase (see column 4, Table 2).

TABLE 2

Number of conceptions and percentage resulting in a surviving child aged one year and two years

Country	Period of Pregnancy	No. of Pregnancies	Number of Live births (LB)	Number of MTP	Number of Still births (SB)	No. of children aged 1 year or 2 years*	% of pregnancy resulting in a surviving child	$\frac{MTP}{LB}$ 100
Canada	2nd April 1983 to 1st April 1984	439,406	375.555	62,056	1,795	376,064 (1986)	85.58	16.52
	2nd April 1982 to 1st April 1983	440,264	373,233	65,131	1,900	373,322 (1986)	84.80	17.45
Cuba	2nd April 1982 to 1st April 1983	287,329	161,136	124,304	1,889	166,919 (1985)	58.09	77.14
	2nd April 1981 to 1st April 1982	256,883	142,082	113,093	1,708	159,025 (1985)	61.91	79.60
India	2nd June 1983 to 1st June 1984	25,422,225	24,625,901	555,826	240,498	21,145,692 (1986)	83.18	2.26
	2nd June 1982 to 1st June 1983	24,811,269	24.074,032	518,928	218,309	20,568,250 (1986)	82.90	2.16
Hong Kong	2nd April 1983 to 1st April 1984	96,097	82,010	13,714	373	77,234 (1986)	80.37	16.72
	2nd April 1982 to 1st April 1983	98,339	85.415	12,499	425	79,934 (1986)	81.24	14.63
Singapore	2nd April 1983 to 1st April 1984	61,101	40,940	19,931	230	42,321 (1986)	69.26	48.68
	2nd April 1982 to 1st April 1983	58,833	42,138	16,434	261	41,909 (1986)	71.23	39.00
Denmark	2nd April 1982 to 1st April 1983	73,760	52,200	21,295	265	51,053 (1985)	69.22	40.80
	2nd April 1981 to 1st April 1982	75,708	52,982	22,451	275	53,036 (1985)	70.05	42.37
Finland*	2nd April 1982 to 1st April 1983	80.302	66,302	13,736	264	64,968 (1985)	80.90	20.72
	2nd April 1981 to 1st April 1982	78,443	64,126	14,055	262	63,789 (1985)	81.32	21.92

TABLE 2 *(Contd.)*

Number of conceptions and percentage resulting in a surviving child aged one year and two years

Country	Period of Pregnancy	No. of Pregnancies	Number of			No. of children aged 1 year or 2 years*	% of pregnancy resulting in a surviving child	$\frac{MTP}{LB}$ 100
			Live births (LB)	MTP	Still births (SB)			
France	2nd April 1983 to 1st April 1984	942,760	753,435	182,841	5,784	763,727 (1986)	81.07	24.27
	2nd April 1982 to 1st April 1983	972,820	785,082	181,556	6,182	756,217 (1986)	77.73	23.13
Hungary	2nd April 1982 to 1st April 1983	211,640	131,988	78,111	1,541	118,737 (1985)	56.10	59.18
	2nd April 1981 to 1st April 1982	220,184	140,564	78,486	1,134	132,565 (1985)	60.21	55.84
Bulgaria	2nd April 1981 to 1st April 1982	276,349	124,321	151,228	800	124,277 (1984)	44.97	121.64
	2nd April 1980 to 1st April 1981	282,420	127,238	155,002	180	129,188 (1984)	45.74	121.82
Czechoslovakia	2nd April 1981 to 1st April 1982	342,760	236,887	104,544	1,329	219,853 (1984)	64.14	44.13
	2nd April 1980 to 1st April 1981	348,563	246,115	101,004	1,404	238,558 (1984)	68.44	41.04
UK	2nd April 1982 to 1st April 1983	793,416	626,730	162,825	3,861	651,727 (1985)	82.14	25.98
	2nd April 1981 to 1st April 1982	799,119	632,358	162,621	4,140	620,789 (1985)	77.68	25.72
New Zealand	2nd April 1982 to 1st April 1983	57,339	50,072	6,977	290	51,149 (1985)	89.20	13.93
	2nd April 1981 to 1st April 1982	57,698	50,581	6,794	323	50,773 (1985)	88.80	13.43
USA	2nd April 1982 to 1st April 1983	5,277,029	3,670,164	1,559,215	47,650	3,603,257 (1985)	68.28	42.48
	2nd April 1981 to 1st April 1982	5,242,836	3,642,028	1,576,452	24,356	3,520,640 (1985)	67.15	43.29

TABLE 2 *(Contd.)*

Number of conceptions and percentage resulting in a surviving child aged one year and two years

Country	Period of Pregnancy	No. of Preg-nancies	Number of			No. of children aged 1 year or 2 years*	% of pregnancy resulting in a surviving child	$\frac{MTP}{LB}$ 100
			Live births (LB)	MTP	Still births (SB)			
Tunisia	2nd April 1978 to 1st April 1979	232,359	210,044	20,551	1,764	204,097 (1981)	87.84	9.78
	2nd April 1977 to 1st April 1978	240,060	217,254	21,150	1,656	198,819 (1981)	82.82	9.92
Israel	2nd April 1982 to 1st April 1983	114,325	97,201	16,521	603	96,221 (1985)	84.16	17.00
	2nd April 1981 to 1st April 1982	109,835	94,152	15,091	592	96,889 (1985)	88.21	16.03

Source: Number of live births, still births, MTP are taken from *Demographic Year Book*. (1988). For USA and Hongkong the number of MTP are taken from *Induced Abortions : A World Review* by Tietze C. and Henshaw, S.K. and the Alan Guttmacher Institute, New York. For India, the data are taken from *Family Planning Year Book* (1985-86). *Sample Registration Scheme Bulletins 1981, 1983, 1984*. and Expert Committee's Population Projections (Median level)

* The first line in each set gives 1 year-old and the second line gives 2 year-old children.

The US' case is interesting. The Supreme Court in the Roe Vx. Wade case had upheld the decision legalising abortion nationwide in 1973. In Mexico City, the U.S. delegate stunned the participants by announcing that it would no longer contribute to private family planning programmes overseas in which abortion is a part. Thus AID has cut off support to the IPPF and UNFPA. On July 3, 1989, the U.S. Supreme Court in the landmark Webster Vs. Reproductive Health Services upheld the right of the State of Missouri to impose a restrictive new law relating to abortion. It might have repercussions on developed and developing countries, a growing number of which have liberalised abortion laws recognising the role of safe abortions in reducing maternal mortality. Notwithstanding this attitude, the people of the USA think differently, while the fact remains that in the USA the number of MTPs was nearly 42 per cent of the live births in 1982-1983.

Women will continue to seek abortion for unwanted pregnancies whether Governments like it or not. They must be provided with information and the means to prevent pregnancy. But if for any reasons these fail, they must have access to a safe, caring abortion service. This will prevent deaths, and serious damage to the health of women and untold misery to their families.

India legalised abortion in April 1972. Yet it is availed of by only about one million of the expected six million per year. This means that the urban rich have access to private doctors, who provide a safe service - albeit not reported. The urban and rural poor go to quacks and have abortions under unhygienic and unsafe conditions. It is not surprising that 20-30 per cent of maternal deaths are due to abortion. An unhealthy practice which is an abuse of modern technology is amniocentesis misused for sex determination followed by abortion of female fetuses in some countries. This reprehensive practice must be stopped by law, social action and peer pressure.

Women have the basic right to choose, if they will have children, how many and at what intervals. They must be helped to exercise this choice by access to safe family planning methods backed up by a safe and humane abortion service.

REFERENCES

1. Self Employed Women's Association (SEWA): *Shramshakti*: "A summary of the report of the National Commission on Self-Employed Women and Women in the Informal Sector" submitted to the Government of India in June 1988.

2. Coyaji, Banoo J.: "How big or small is 'M' in MCH in India"?: "Measures for Rationalisation", Paper presented at the ICMR/WHO National Workshop on Delivery of Family Health Care Services. Guwahati, 26-28 November, 1986.

IMMUNISATION IN RURAL HOUSEHOLDS OF DHARWAD DISTRICT

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INTRODUCTION

India has been engaged in an expanded programme of immunisation for protecting young children against the common childhood diseases. Though the programme has achieved some degree of success in eradicating small pox, due to various reasons, it has not yet been possible for the Government to eradicate the other childhood diseases. Although the health services and maternal and child health clinics are involved in the immunisation programme, the entire vulnerable population has not been reached. Hence, it is was considered worthwhile to study the constraints suffered by this programme so as to build a healthy population and in turn a healthy nation.

OBJECTIVES

Studies relating to the acceptance of the immunisation programme particularly in rural areas of different regions of the country, where child loss due to preventable diseases is high, would help both policy makers and field workers to approach people in an effective way so as to improve acceptance and thereby programme performance. The present study focusses on the adoption of immunisation in rural households with different sizes of landholding, caste and family type. It also aims at finding out reasons for the non-acceptance of child immunisation.

SAMPLE AND METHODOLOGY

The investigation was carried out by the All India Coordinated Research Project on Home and Farm Management, College of Rural Home Science, University of Agricultural Sciences, Dharwad. Data on the management of resources in rural households was collected in the year 1986. Out of a total of 1214 households in four randomly selected villages -- Kurubagatti, Shibargatti, Shivalli and Managundi -- in Dharwad District, Karnataka State, 206 were selected proportionately based on the total households under each landholding category.

The sample comprised of 31 landless households (no land), 38 marginal landholding households (below 2.5 acres), 41 small landholding households

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(2.5-5 acres), 47 medium landholding households (5-10 acres), and large landholding households (above 10 acres). The classification of caste was done according to the Karnataka Gazette (1981). The investigation was carried out in eligible households in which young children were present with reference to the administration of the BCG, polio and triple antigen vaccines.

Definitions

An eligible household was considered as one in which there were one or more children who were in the eligible age group for receiving the BCG, polio and triple antigen vaccines. The word 'regular' was used for households in which immunisation was adopted as per schedule. The word 'irregular' was used for households which did not adopt immunisation as per schedule, and the word 'never' was used to denote households in which immunisation was not adopted at all though they had children eligible for immunisation.

RESULTS AND DISCUSSION

The immunisation status for BCG, polio and triple antigen in the sampled households is presented in Table 1.

TABLE 1

Distribution of households by adoption of immunisation

Vaccine	No. of households	No. of "eligible" households	Adoption of immunisation		
			"Regular"	"Irregular"	"Never"
BCG	206	161	77(47.2)	27(16.8)	57(35.4)
Polio	206	161	85(52.8)	17(10.6)	59(36.6)
Triple antigen	206	161	82(50.9)	15(9.3)	64(39.8)

Figures in brackets represent percentages.

In the case of the BCG vaccine, almost half (47.8 per cent) of the total eligible households were 'regular', while 35.4 per cent were 'never' adopters. Similarly, in the case of the polio vaccine, 52.8 per cent of the total households were in the 'regular' category, 10.6 per cent were 'irregular' and 36.6 per cent were 'never' households.

These results differ from the findings of Patodi[1] and Ganguli et al[2] who reported that the immunisation status of the children studied by them was very poor and poorest in case of triple antigen (5.2 per cent). However, Basu[3] reported that despite a high drop out rate between the first and third doses of vaccine, the immunisation programme was making steady progress.

The response of the households in each of the selected villages to the three vaccines is given in Table 2.

TABLE 2

Villagewise adoption of immunisation

Vaccine	Adoption of immunisation	Percent households immunised in Village			
		Kurubgatti *(N=55 n=49)	Shibargatti (N=26 n=25)	Mangundi (N=71 n=42)	Shivalli (N=54 n=45)
	"Regular"	53.1	56.0	28.6	55.6
BCG	"Irregular"	10.2	8.0	33.3	13.3
	"Never"	36.7	36.0	38.1	31.1
	"Regular"	53.1	52.0	45.2	60.0
Polio	"Irregular"	12.2	4.0	16.7	6.7
	"Never"	34.7	44.0	38.1	33.3
	"Regular"	53.1	52.0	42.9	45.6
Triple	"Irregular"	12.2	4.0	14.3	4.3
antigen	"Never"	34.7	44.0	42.9	40.0

N = number of households; n = number of eligible households.

In the case of the BCG vaccine, Shibargatti village had the highest proportion of immunised households (56 per cent) followed by Shivalli (55.6 per cent), Kurubagatti (53.1 per cent), and Managundi villages (28.6 per cent). Managundi village had the highest proportion of "irregular" households (33.3 per cent). On an average, 31 to 38 per cent of the sampled households in each village had not immunised their children against tuberculosis, though this particular immunisation programme had been introduced decades ago.

The "regular" adoption of polio immunisation was highest among the households of Shivalli (60.0 per cent), followed by those of Kurubagatti (53.1 per cent), Shibargatti (52.0 per cent) and Managundi villages (45.2 per cent).

The triple vaccine which provides protection against tetanus, diphtheria and pertussis was neglected by the rural households. In Kurubagatti and Shibaragatti villages more than 52 per cent of the households had immunised their children with the triple dose as compared to those (less than 46 per cent) in Managundi and Shivalli villages. Ganguli et al[2] also reported a very poor response to the triple vaccine and a lack of response to immunisation against typhoid, tuberculosis and poliomyelitis.

The findings clearly indicate that the "regular" adoption of immunisation with regard to BCG, polio and triple antigen was lowest in Managundi village as compared to the other three villages. Even the percentage of "irregular" adopters was found to be high, suggesting the need for an intensified approach to implement the immunisation programme effectively.

A caste-wise distribution of households and their adoption of immunisation is given Table 3.

TABLE 3

Percent distribution of households by adoption of immunisation, caste and type of family

Vaccine	Adoption of immunisation	Caste		Type of family		
		Upper caste (N=128; n=98)	Lower caste (N=78; n=63)	Nuclear (N=81; n=61)	Joint (N=66; n=57)	Extended (N=59; n=43)
BCG	"Regular"	50.0	44.4	39.3	61.4	41.9
	"Irregular"	20.4	11.2	19.7	12.3	18.6
	"Never"	29.6	44.4	41.0	26.3	39.5
Polio	"Regular"	56.1	47.6	45.9	63.1	48.8
	"Irregular"	9.2	12.7	13.1	12.3	4.7
	"Never"	34.7	39.7	41.0	24.6	46.5
Triple antigen	"Regular"	56.1	42.9	45.9	59.7	46.5
	"Irregular"	9.2	9.5	8.2	14.0	4.7
	"Never"	34.7	47.6	45.9	26.3	48.8

N = number of households; n = number of eligible households.

The findings show that a higher percentage of upper caste households were "regular" adopters, and had immunised their children with the BCG (50 per cent) polio and triple antigen (56.1 per cent each) vaccines as compared to the lower caste households. Further, the proportion of non-adopters among the former was also less. This could be attributed to better education and more facilities available to upper caste households.

Ganguli et al[2] and Vani Reddy[41] also found that a higher proportion of parents who were literate had immunised their children as compared to their illiterate counterparts.

The type of family also seemed to influence the acceptance of immunisation. From Table 3 it is evident that the adoption of BCG, polio and triple antigen vaccines in joint families was higher (61.4 per cent, 63.1 per cent and 59.7 per cent respectively) followed by extended and nuclear families.

In all, 40 per cent of the nuclear and extended families did not follow the immunisation schedule, whereas only 26 per cent of joint families fell in this category. One reason could be that the elder members in a joint family may influence younger couples to immunise their children.

The adoption of immunisation was also better in households with bigger landholdings as compared to those with a smaller one as can be seen from Table 4.

The percentage of "regular" adopters of BCG was higher among households with small, medium and large landholdings (52.8 per cent, 46.8 per cent and 57.1 per cent respectively) as compared to those who were landless or had marginal landholdings (40.9 per cent and 38.9 per cent respectively).

TABLE 4

Percent distribution of households by adoption of immunisation and size of landholding

Vaccine	Adoption of immunisation	Size of landholding				
		Landless (N=31; n=22)	Marginal (N=38; n=36)	Small (N=41; n=36)	Medium (N=47; n=32)	Large (N=49; n=35)
BCG	"Regular"	40.9	38.9	52.8	46.8	57.1
	"Irregular"	31.8	16.7	8.3	18.8	14.3
	"Never"	27.3	44.4	38.4	34.4	28.6
Polio	"Regular"	54.6	44.4	55.6	50.0	60.0
	"Irregular"	13.6	16.7	2.8	9.4	11.4
	"Never"	31.8	38.9	41.6	40.6	28.6
Triple antigen	"Regular"	45.5	41.7	55.5	46.8	62.9
	"Irregular"	13.6	13.9	2.8	9.4	8.5
	"Never"	40.9	44.4	41.7	43.8	28.6

N = number of households; n = number of eligible households.

"Regular" immunisation against polio was to the extent of over 50 per cent among landless, small, medium and large landholding households (54.6 per cent, 55.6 per cent, 50.0 per cent and 60 per cent respectively), except in marginal households (44.4 per cent). "Regular" triple antigen immunisation was higher in households with small and large landholdings (55.5 per cent and 62.9 per cent) as compared to the other categories of households (45.5 per cent in landless, 41.7 per cent in marginal and 46.8 per cent in medium).

Again, the percentage of households who had never immunised their children was higher in case of households with smaller landholdings as compared to those with bigger landholdings (28.6 per cent).

The rural households gave varied reasons for not immunising their children (Table 5).

TABLE 5

Reasons for not immunising children

Reasons	Households	
	Number	Percentage
Inconvenient; too busy with work	8	13.0
Financial constraints	2	3.0
Not interested	8	12.0
Does not know the importance of immunisation	33	50.0
Negative experience in the past	8	12.1
Lack of awareness of services	28	42.4
Lack of medical facilities	2	3.0

More than one reason has been given.

The majority (50 per cent) did not seem to know the importance of immunisation. Lack of awareness about immunisation services was another reason for not immunising their children (42.4 per cent). Other reasons included side effects such as fever, or blind beliefs that the immunised children would be crippled (12.1 per cent), lack of "interest" (12.1 per cent), or the parents/elders being too busy to make it inconvenient to take their children for immunisation. Only 3 per cent of the households opined that lack of medical facilities and financial constraints were the reasons for not immunising their children. Vani Reddy[1] reported that illiteracy, ignorance and negligence of parents were the causes for not immunising the children in her study.

CONCLUSION

Though the immunisation programme has been introduced decades ago the results indicate that on an average, only 50 per cent of the children in the eligible age groups have been protected. This is mainly due to their dropping out between the first dose and the third dose, as a result of side effects such as fever and blind beliefs. The households need to be educated in this regard.

Landholding, caste and type of family seemed to exert some influence in the adoption of immunisation. Households of upper caste families, joint families, and those with bigger landholding were more likely to immunise their children as compared to those of lower caste, consisting of extended or nuclear families, and with small or no landholding. Lack of awareness, ignorance and blind beliefs were the main barriers which prevented the immunisation of children. Education about the benefits of immunisation and the availability of immunisation services should take care of these things. Therefore, intensified efforts on the part of the Government as well as voluntary agencies for educating and creating awareness among the rural households is very crucial for the success of the immunisation programme and also to provide "Health For All".

REFERENCES

1. Patodi, S. and Patodi. S.K.: "Health status of school children in some primary schools of Indore City (MP)", *Indian Journal of Public Health*, XVI(2): 71-77 (1977).
2. Ganguli, J. and Bhattacharya. J.: "Study of immunisation status of children upto 12 years of age", Indian Journal of Public Health, XXII(3): 246-48 (1978).
3. Basu, N.: "Indian immunisation programme", *World Health Forum*, 6(1): 35-41 (1985).
4. Vani Reddy: "Immunisation in Hyderabad slums", *Social Welfare*, XXXV(2): 31-38 (1988).

RELIGION, CASTE/TRIBE AND MARRIAGE AGE OF FEMALES IN INDIA: A STUDY BASED ON RECENT CENSUS DATA

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INTRODUCTION

Female age at marriage is an important determinant of fertility; its increase has been associated with declines in population growth[1-2], as well as in infant and maternal mortality[3]. In India, female age at marriage has been very low due to the wide prevalence of child marriages[4]. Despite several legislative efforts to check the practice of early marriage, child marriages are still prevalent in some parts of the country[5-6].

Traditionally, marriage has been guided by religion. For example, Christianity encourages celibacy and late marriage by attaching purity and sanctity to unmarried life—though it recognises that marriage is essential for procreation, those who have refrained from marrying are hailed and revered. On the other hand, Islam and Hinduism advocate that marriage is a religious duty for everybody and those who remain unmarried even after reaching the marriageable age are considered to be improper and disreputable[7]. Further, marriage is sacrosanct among Hindus and Christians, whereas it is a contract according to Islam. In Hinduism along with sacredness, marriage is irrevocable, as wife and husband are supposed to be bound to each other even after death. Hindu religious scriptures preach pre-pubertal marriage for females, and keeping a daughter unmarried beyond the age of puberty is tantamount to committing a sin on the part of the father. Islam does not specify a particular age for marrying off girls but there is an emphasis on puberty[8], and the consent of the girl is a pre-requisite for legal marriage. Marriages of minors can also be arranged but the girl can refuse on reaching puberty if she is married off by her guardian (other than the father and grandfather), or if married off by her father, she is entitled to its dissolution if she repudiates it, provided that it is not consummated before she attains the age of eighteen[9].

In the case of smaller castes and tribes, in addition to religion, tradition and customs also play an important role in influencing the age at marriage. Studies concerning the influence of religion and social groups on marriage age

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must keep in mind the growing heterogeneity in social and economic terms within each religious and social group of India due to the rapid social and economic changes taking place in the country. This has made the situation rather complex for studying the relationship between female age at marriage and religion and caste/tribe status *per se*.

OBJECTIVES

An understanding of the factors associated with age at marriage therefore will be an important step towards eradicating this social malaise. The present paper makes an attempt to study the influence of religion and caste/tribe status on the age at marriage for females in the light of recent data available from the 1981 census.

DATA

The 1971 census of India for the first time included a direct question on age at marriage for currently married women. This was continued during the 1981 census, and covered all ever married women. The inclusion of this question has yielded information on age at marriage for females by religious groups and scheduled castes and scheduled tribes. These data have been published in occasional papers of the Census of India separately for 1971[5-6] and 1981[5-6]. Data obtained from these censuses were analysed in order to study the age at marriage of females by religion, caste and tribal status.

RESULTS AND DISCUSSION

Religion and Age at Marriage for Females

The median age at marriage for females by religion for the years 1971 and 1981 has been presented in Table 1.

TABLE 1

Median age at marriage (in years) for currently married females by religion, 1971-81

* Religion	Rural			Urban		
	1971	1981	Difference	1971	1981	Difference
All religions	15.3	16.0	.7	16.5	17.4	.9
Hindus	15.1	15.9	.8	16.4	17.3	.9
Muslims	15.4	15.9	.5	16.4	17.1	.7
Christians	18.5	19.1	.6	19.4	19.8	.4
Sikhs	17.7	19.0	1.3	17.8	19.1	1.3
Buddhists	15.1	16.1	1.0	15.8	16.5	.7
Jains	15.7	16.5	.8	17.1	18.5	1.4

Source: Census of India, Occasional Paper No. 4 and 7 of 1977 and 1988 respectively, Office of the Registrar General and Census Commissioner, New Delhi.

Table 1 indicates that in 1981, female age at marriage among Christians was higher than that among Sikhs, followed by Jains and Buddhists both in

rural and urban areas. While rural and urban Christian and Sikh women married on average at 19 years or later, Hindu and Muslim women exhibited an almost identical age at marriage of about 16-17 years. The latter were also the youngest (15.9 years) at the time of marriage among all the religious communities in the rural areas, whereas Buddhist women occupied this position in the urban areas (16.5 years). The median age at marriage for Jain women worked out to 16.5 and 18.5 years in rural and urban areas respectively.

While all the religious communities showed an increase in the median female age at marriage during the period 1971-81, this increase was less than one year for all except Sikh women for whom it was 1.3 years - both rural and urban -, for urban Jain women (+ 1.4 years), and rural Buddhist women (+ one year) (Table 1). The relatively faster increases among the Sikh community during the 1971-81 decade is apparently a result of the better agricultural performance leading to a higher level of female literacy and education in Punjab (34 per cent as compared to 25 per cent for India in 1981) where the majority of the Sikhs reside. In fact, female literacy was very high (52 per cent) during the period of the green revolution (1981-71) in Punjab. It has been shown by researchers that higher agricultural productivity is significantly associated with higher age at marriage and higher female literacy at the district level in India[10].

Table 1 further indicates that Christian and Muslim women showed the least increase in median age at marriage during the 1971-81 decade. While Christian women have reached a comparatively higher age at marriage beyond which further increases are likely to be small, the small increases among Muslim women appear to be due to the relatively weaker response of the community towards female education. Recent information regarding literacy and education by religion is not available from the census data since independence, though data from earlier censuses of British India show that religious groups with higher female age at marriage had higher literacy levels and vice versa. For example, in 1931, the literacy rate among Christian women (age 5 and above) was 20.3 per cent, followed by 2.9 per cent for Sikhs, 2.1 per cent for Hindus and 1.5 per cent for Muslims[11]. It is quite likely that a similar trend has continued to persist in India after independence.

A cross-classification of female age at marriage by social and economic variables such as education and occupation within each religious community of India would have better acquainted us with the influence of religion on the one hand and the influence of social and economic conditions on the other. There is a lack of relevant data in this regard, and available information from the 1971 census shows that differentials by religion and educational level of women persist within each level of education. As such, Christian graduate women were observed to marry later than Hindu or Muslim graduate women[12]. One may attribute such differentials to the influence of religion.

However, the initial advantage of a late marriage due to early exposure of Christian women to western education cannot be ignored. It is true that religion has an impact on the timing of marriage as far as religious precepts are concerned. At the same time, one also expects a narrowing down of differences in marriage age exclusively due to religious practices in the light of the spread of education. This is evident from the fact that age at marriage for females has risen among all religions groups and also that a higher age at marriage is consistent with higher literacy and education and vice-versa as noted above.

Caste/tribe Status and Age at Marriage for Females

After independence, the publication of data on caste except for scheduled castes and scheduled tribes was discontinued. However, the earlier censuses provide a rich source of information of the marriage practices of individual castes in different regions of the country. The Census Commissioner for the 1931 census reported that, as a rule, the lower the caste the greater was the prevalence of child marriage. For example, in Bihar and Orissa, child marriages were more numerous among Chamars, Goales, Mushhars, Telis and Koiris[13], and lowest among Brahmans, Babhans, Rajputs and Kayasthas. Similarly, in the united province (U.P) child marriages were more prevalent among Koiris, Pasis, Kumhars, Ahirs and Chamars and less so among Kayasthas, Saiyids and Sheikhs. In Bengal, the Chasi Kairbartta caste practiced early marriages, while Brahmans, Baidyas and Shahs took the lead in postponing the marriage of both boys and girls. In Baroda and Gujarat, the Kadwa Kanbi caste showed a very high proportion of infant marriages[14]. Child marriage in Rajputana was more prevalent among Gujars, Jats, Kumhars and Chamars, than among Rajputs, Rawats, Meos and Moghals, while prenatal betrothal was also observed among Kunbis, Chanbis, Jats, Kumhars, Malis, Nais and Rebaris[15].

The main reasons mentioned in these reports for child marriages were partly economic and partly due to a shortage of women. It was economical to arrange marriages of infants and children at a time in order to reduce the costs of marriage while the shortage of females increased the competition among males to secure a girl as early as possible. A recent report from Rajasthan links the incidence of child marriages with poverty[165].

The level of child marriages was also related to the level of literacy among the various castes. For example, Brahmans, Baidyas and Kayasthas whose daughters married later also had higher literacy levels. Female literacy among Baidyas was the highest in 1931 (48.6 per cent), followed by Nayars (27.6 per cent), Kayasthas (19.1 per cent), Khatris (12.6 per cent) and Brahmans (9.6 per cent). Female literacy among the other lower castes who practiced infant and child marriages, was less than one per cent or even nil in many cases[11]

The latest information on age at marriage particularly for scheduled castes

who mainly constitute lower castes, confirms the trend observed in British India even for recent times. It may be seen from Table 2 that the scheduled castes had the lowest age at marriage both in rural and urban areas.

TABLE 2

Median age at marriage (in years) of currently married general, scheduled caste and scheduled tribe females, 1971-81

	Rural			Urban		
	1971	1981	Difference	1971	1981	Difference
General	15.3	16.0	.7	16.5	17.4	.9
Scheduled caste	14.8	15.6	.8	15.4	16.1	.7
Scheduled tribe	16.1	16.8	.7	16.4	17.0	.6

Source: Census of India, Occasional Paper No. 4 and 7 of 1977 and 1988 respectively, office of Registrar General and Census Commissioner, New Delhi.

Similarly, female literacy among scheduled castes was extremely low - 10.9 per cent in 1981 (Table 2). The scheduled tribes showed a higher female age at marriage than the scheduled castes in both rural and urban areas and also had a slight edge over other females (general) particularly in rural areas. The relatively higher female age at marriage among scheduled tribes is due to the fact that the tribes, who generally live in forested and hilly areas, remain largely secluded from the mainstream culture known for its wide practice of child marriages in the past, and continue to practice their own customs and traditions in relation to marriage without any influence from the outside. However, in recent times, particularly in some parts of the country (Rajasthan and Madhya Pradesh), female age at marriage among tribes has been reported to be low (less than 16 years in 1981) probably due to the influence of the prevailing trends in the areas as a consequence of their exposure to it.

Female literacy among the tribes of this part of the country is also characteristically low (less than 4 per cent female literacy in 1981). Further, when compared with north east India (particularly Nagaland and not Mizoram), it shows a striking difference - the age at marriage for tribal females is much higher in north east India (20 years and more) as also the level of female literacy (55 per cent female literacy in Mizoram and 33 per cent in Nagaland). These two contrasting features highlight the fact that literacy is crucial for increasing marriage age even for the tribal segment of the population. Thus, female literacy is extremely important in raising the age at marriage for females irrespective of the nature of religion and social groups.

CONCLUSION AND SUGGESTIONS

The age at marriage for females by religion and caste/tribe status studied on the basis of recent census data was observed to be consistent with the level

of female literacy. This was also true for tribes when regional groups were compared. Differentials by religion and caste did not exclusively reflect social norms but were increasingly associated with the level of female literacy, suggesting that an increase in female literacy and/or educational levels can possibly be of great help in freeing communities and areas from the retrograde practice of early marriage. This can be done either through stimulating economic change or by making higher educational investments within the framework of a suitable educational policy for areas and communities with a low female age at marriage and low levels of literacy and education.

REFERENCES

1. Agarwala, S N.: "Raising the marriage age for women: A means to lower the birth rate". *Economic and Political Weekly*, 24 December : 797-798 (1966).
2. Malaker, C.R . "Female age at marriage and the birth rate in India" *Social Biology*, 19: 297-301 (1972).
3. Reddy, P.H.:"The bane of early marriage" *The Times of India*, 24 February 1987, Bombay.
4. Agarwala, S.N.: *Age at Marriage in India*, Kitab Mahal Publishers, Allahabad, 1982.
5. Singh, C.: "People's perception on age at marriage in Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh", IASSP 11th Annual Conference, Varanasi, 1986.
6. Pal, B.: "Child marriage in Marwar", *The Indian Express*, 3 May 1987, Bombay.
7. Westermarck, E.: *A Short History of Marriage*, Macmillan and Company Limited, London. 1926.
8. Goode, W.J.: *World Revolution and Family Patterns*, Colliner-Macmillan Limited, London, 1963.
9. Kapadia, K.M.: *Marriage and Family In India*, Oxford University Press, London, 1963.
10. Bhagat, R.B.: "Economic factors and female age at marriage in India: A District level study" *Journal of Institute of Economic Research*, 24(2): 16-26 (1989).
11. Census of India: *Literacy and Marital Status*, Census Centenary Monograph. No. 9, 1971.
12. Bhagat, R B.. "Female age of marriage in India: Regional variations and associated factors", unpublished Ph.D Dissertation, University of Bombay, 1987.
13. Census of India: *Bihar and Orissa*, Part I, Report 150-166, 1931.
14. Census of India: *Age and Marital Status*, Census Centenary Monograph, No. 8, 1972.
15. Census of India: *Rajputana and Ajmer—Marwar*, Part 1, Report: 155-174, 1911
16. Rai, U : "Child marriages are linked to poverty", *The Times of India*, 9 March 1990, Bombay.

BREASTFEEDING AND WEANING PRACTICES—A RURAL STUDY IN UTTAR PRADESH

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INTRODUCTION

The practice of breastfeeding is almost universal in India. Protecting, promoting and supporting breastfeeding should be the foremost aim of all the communities. Compare the body of a lactating mother to a baby food factory and we find that she is far and away the most efficient[1].

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of all normal infants. This shows the importance of good nutrition during lactation. The first milk or colostrum is of particular value to the infant given its high content of proteins and fat soluble vitamins, and its anti-infective properties. It is the infant's first immunisation[2]. However, many rural folk discard this precious material. Ideally, exclusive breastfeeding should be the norm for the first 4-6 months of life and homemade soft foods should then be added to the infant's diet.

OBJECTIVES

The present study was undertaken to study breastfeeding and weaning practices in a rural setting in north India with a view to strengthen breastfeeding and infant feeding practices for improving the health of infants.

SAMPLE AND METHODOLOGY

The study was conducted in four randomly selected villages of Jawan Block, District Aligarh in Western Uttar Pradesh from May 1987 to April 1989. From these villages, a total of 212 pregnant women in the last trimester were registered for the study. The women were contacted at their respective homes, and advice regarding breastfeeding practices and the benefits of colostrum feeding was given during the first contact. The importance of weaning after four to six months of breastfeeding was also explained to all the women.

The women were first contacted immediately after child birth when information regarding breastfeeding and colostrum feeding practices was col-

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lected and recorded in a pretested proforma. They were subsequently followed up at monthly intervals for a period of two years. Two visits in the week immediately after the delivery of the newborn were mandatory so as to record the right time for the commencement of breastfeeding and to know whether the colostrum was being fed to the newborn or not. Social class was determined by Prasad's modified classification[3]. The monthly per capita income in each social class was multiplied by 4.17 on the basis of the price index of all commodities with a view to update Prasad's classification.

RESULTS AND DISCUSSION

The majority of the 212 women (96.7 per cent) were Hindu; the rest (3.3 per cent) being Muslim. They were almost equally distributed among the three caste groups namely, high caste—33.5 per cent, backward caste—30.2 per cent, and schedule caste—36.3 per cent. Significantly, as many as 93.0 per cent were illiterate. Of the 15 who had received education, two were graduates, one each was just literate or had studied upto the intermediate level, five had received primary education, and four had attended high school. The literacy rate of 7.1 per cent found in the present study was thus much lower than the national average for females (17.9 per cent) in rural areas and 14 per cent in Uttar Pradesh. All the women were housewives. Going out to the fields for work was their only outdoor activity.

Table 1 presents a distribution of the women by their breastfeeding practices and also provides the reasons given by those who did not nurse their infants.

TABLE 1

Distribution of women by breastfeeding practices and reasons for not breastfeeding their infants

Village	Whether breastfeeding		Reasons for not breastfeeding			Total
	Yes	No	Failure of lactation	Death of newborn	Infant did not suckle*	
Oriha	35	1	—	1	—	1(5.5)
Nagola	74	10	1	6	3	10(55.5)
Rampur	59	6	1	5	6	6(33.5)
Chandokha	26	1	—	1	—	1(5.5)
Total	194	18	2	13	3	18(100.0)

* Infant premature, congenital defect or LSCS.
The figures in brackets denote percentages.

Table 1 indicates that as many as 91.5 per cent of the women breastfed their infants. Those (18 or 8.5 per cent) who did not had either lost their newborn (6.1 per cent), the infants did not suckle (1.5 per cent), or had been

born prematurely or were small in relation to the gestation period (twins). In two cases, the women could not nurse their infants due to failure of lactation. Lactation failures are so rare as to be practically insignificant[4]. However, positive influences and support could help and negative influences could hinder the process of lactation[5].

Breastfeeding on the second day was observed in 44.3 per cent of the women, 35.5 per cent of newborn infants got breast milk after a lapse of three days, 17.5 per cent on the fourth day of birth, and only 5 or 2.6 per cent got it a day after birth. None of the infants received breast milk on the day of birth. Almost similar observations have been reported by other authors[6-7] in rural areas of Agra and Varanasi district of Uttar Pradesh where breastfeeding was started after two days postpartum in 97.2 per cent and 91.6 per cent of the cases respectively, and after three days in 26.6 per cent and 20.2 per cent cases respectively. In another study[8] breastfeeding on the same day was practically absent and given by only 3.8 per cent of the mothers; over half (53.4 per cent) initiated breastfeeding on the third day (53.4 per cent), 38.8 per cent did so on the second day.

In the present study, the majority of the women breastfed their newborn on the second or third day and none did so on the day of birth. This is a significant finding. In contrast to other studies, this study shows that delayed breastfeeding is still common and is practiced in the rural areas of Uttar Pradesh, whereas according to the latest joint WHO/UNICEF statement[2] mothers should be helped to initiate breastfeeding within half an hour of child birth. On the other hand, a WHO report[9] states that studies have confirmed the benefit of early breastfeeding in reducing weight loss, raising blood glucose levels, lowering unconjugated bilirubin in the serum, reducing dehydration and leading to a more rapid return to birth weight.

Colostrum Feeding Practices

Though colostrum is regarded as an ideal feed for the newborn, only 25 (11.8 per cent) of the women gave colostrum to their infants following counselling. However, over four-fifths (88.2 per cent) did not give it in spite of constant efforts to motivate them to do so as shown in Table 2.

The commonest reason for not giving colostrum cited by over three-fifths (63.6 per cent) of the women was the religious belief that dropping milk on mother earth would ensure a continuous flow of milk; otherwise breast milk would dry up. Other reasons were that it was thick (12.8 per cent), unclean (11.8 per cent), and its removal would make suckling easy for the baby (11.8 per cent) as shown in Table 2. A study conducted by DANIDA[10] in seven districts of Madhya Pradesh reported only 51.5 per cent as stating that colostrum was important; other reasons for not feeding the baby with colostrum were: dirty (25.9 per cent), harmful (23.0 per cent), baby will become ill

TABLE 2

Distribution of women by colostrum feeding practices and reasons for not giving colostrum to their infants

Village	Whether fed colostrum			Reasons for not giving colostrum				
	Given	Not given	Total	Thick	Unclear	To make suckling easy	Religious	Total
Oriha	3	33	36	5	6	2	20	33(17.5)
Nagola	12	72	84	9	10	8	45	72(38.5)
Rampur	9	56	65	7	4	5	40	56(30.0)
Chandokha	1	26	27	3	2	7	14	26(14.0)
Total	25 (11.8)	187 (88.2)	212 (100.0)	24 (12.8)	22 (11.8)	22 (11.8)	119 (63.6)	187 (100.0)

Figures in brackets denote percentages.
Colostrum feeding practice in the four villages is almost similar and statistically insignificant : x^2 2 (0.5) at 1 df>3.84

(13 per cent), causes pain in the abdomen (3.4 per cent), too thick (2.0 per cent), and stagnant (1.4 per cent). Almost a third of the respondents did not give any reason for discarding it.

An inverse relation is usually found between socio-economic status and breastfeeding[11]. In the present study, over half of the women (53 per cent) belonged to social class IV, followed by a quarter (25.4 per cent) in social class III, a third (15.5 per cent) in social class V; only 3 (1.1 per cent) and 10 (4.7 per cent) belonged to social class I and II respectively. Thus, as many as 68.5 per cent of the women belonged to the lowest socio-economic status. As such, prolonged breastfeeding was a regular feature observed among them, because it is the most convenient and economical way of feeding babies. On the other hand, an international collaborative study[12] reported that among the rich, a large number of women in India (59 per cent) gave "no milk", or "insufficient" as the reason for not breastfeeding their babies. It has also been shown that the higher the educational status of the Indian mother, the lower is the incidence of successful lactation[12-15].

In the present study, normal growth was observed in exclusively breastfed babies during the first four months of life irrespective of socio-economic status. Studies[16-18] from India and abroad indicate that milk from low income group mothers may contain enough energy to sustain the growth of their infants for the first 4-6 months of life. Even a WHO international collaborative study[12] has shown that except for the very poor, poor lactating mothers from developing countries do not differ much from mothers of the so-called developed countries as far as the quantity and quality of breast milk is concerned. While Swedish mothers had a higher output of milk with higher fat content than mothers from developing countries, the latter seem to compen-

sate to a significant extent by producing milk with high protein and lactose contents[19]. However, in a grossly undernourished mother, lactation could cease totally below a certain body weight[20].

All women continued breastfeeding during the period of study and also planned to do so till the child was three to four years of age. None practiced contraception while she was breastfeeding her baby with the result only four women conceived within the second year of breastfeeding and only two conceived within the first year of breastfeeding. Surprisingly, no woman conceived within the first eight months of breastfeeding. This shows a definite contraceptive effect of breastfeeding for a period of 6-8 months Studies[21,22] conducted abroad have also shown that beyond 10 months of breastfeeding, amenorrhoea continues almost as long as breastfeeding does. The longest periods of breastfeeding were found in Ecuador, Haiti, Paraguay and Peru (12 to 18 months). Thus, economic development operates upon fertility in an opposite direction through increased contraception and reduced breastfeeding. However, DHS data show a recent increase in breastfeeding in some countries[11].

Weaning of the infant was not done religiously after four to six months except among high caste Brahmins and Thakurs. Women belonging to scheduled and backward castes did not make any special effort to wean the child. The child was given the same family food after the eruption of the first four teeth. The concept of not giving any solid foods was mainly because the child has no teeth and it is difficult for him to chew. The women did not believe in making special semi-solid food for children like khicheri, dalia, sago, suji or rabri. It was also observed that very few children below one year of age were given any kind of solid food. A few mothers who had to go out to work in the fields also gave bottle-feeds. They complained of not being able to buy a bottle from the market because of their poor purchasing power and therefore any empty bottle was used along with a nipple to serve the purpose. Only women of the higher social classes who could afford artificial feeds, did so not knowing the importance of breastfeeding but trying to modernise themselves by aping people in urban areas. A gross lack of knowledge among rural women about the importance of breastfeeding was observed. They thought that they had no choice except breastfeeding because of their poor socio-economic status. Gopalan[23] has reported that infants given early supplementary foods, especially the commercial baby foods, fared no better indicating that early supplementation of baby foods (with the increased risk of infection that it involves), may not be the answer. He therefore suggests that attempts must be directed to improve the lactation of the mother through nutritional supplementation and counselling rather than direct "intervention" and supplements added to the infant's diet between four and six months.

CONCLUSION

The importance of breastfeeding lies both in its positive impact on the

child's health and survival and in its inhibiting effect on ovulation and therefore on fertility. In rural areas every effort should be made to protect, promote and support the already existing practice of breastfeeding specially through the health services. Improvement in nutrition during pregnancy and during lactation should be one of the aims of the services offered at the village level. Nutrition education to help mothers to wean their children at the proper time with locally available cheap foods should be encouraged. The cornerstone of any public health nutrition programme for the prevention of childhood malnutrition must be the need to promote an "optimal lactation pattern in the community".

REFERENCES

1. Thomson A.M., Hytten, F.E and Billewicz, W.Z.: "The energy cost of human lactation", *Br. J. Nutrition*, 24: 565-568 (1984).
2. WHO/UNICEF: "A Joint Statement - Protecting, Promoting and Supporting Breastfeeding - The special role of maternity services, 1989."
3. Prasad, B.G.: "Changes proposed in the social classification of Indian families - Revised on 15th April 1969", *Journal of Ind. Med. Ass.* 55: 198-199 (1970).
4. Gopujkar, P.V., Chaudhari, S.N., Ramaswami, M.A., Gore, M.S., and Gopalan, C.: "Infant feeding practices with special reference to the use of commercial infant foods", *Scientific Report 4*, Nutrition Foundation of India, 1984.
5. Jelliffe, D.B., Jelliffe, E.F.P. In *Human Milk in the Modern World*. Oxford University Press, London, 224-225, 1978.
6. Kalra, A., Kalra, K., and Dayal, R.S.: "Breastfeeding practices in different residential economic and educational groups", *Indian Pediatrics*, 19(5): 419-426 (1982).
7. Katiyar, G.P., Aggarwal, D.K., Tripathi A.M., and Aggarwal, K.N.: "Feeding practices in Varanasi District", *Indian Pediatrics*, 18(1): 65-70 (1981).
8. Stoch M.B., Smythe, P.M., Moodse, A.D., and Bradshaw, D.: "Psychosocial outcome and CT findings after gross under nourishment during infant and 20 years development study", *Development Med. Child Neurol.*, 24: 419-421 (1982).
9. Davies, R.F.: "WHO Review of recent literature", *Time of first feeding MCH*, 85: 121-143 (1988).
10. National Institute of Health and Family Welfare: "Demographic situation and utilisation of health and family welfare in Madhya Pradesh: A baseline survey report on levels of fertility, mortality family welfare services in project districts," Report of the Department of Statistics and Demography, National Institute of Health and Family Welfare, New Delhi, 1983.
11. Institute for Resource Development/Washington House: Demographic and Health Surveys Newsletter, Columbia, Maryland USA, Summer 1988.
12. World Health Organisation: *Contemporary Patterns of Breastfeeding: Report on the WHO Collaborative Study on Breastfeeding*, WHO, Geneva, 1981.
13. Ghosh, S., Gindwani, S., Mital, S.K., and Verma R.K.: "Socio- cultural factors affecting practices in an urban community", *Indian Pediatrics*, 13:827-832 (1976).
14. Walia, B.N., Gambhir S.K., and Bhatia, U.: "Breastfeeding and weaning practices in an urban population", *Indian Pediatrics*, 11: 133-137 (1974).
15. Chowdhary, M., Dutta, N., Sarkar, A., and Dey B.: "Breastfeeding by urban mothers", *JIMA*, 70:221-224 (1978).

16. Das, D., Dhano, J., and Cowan, B.: "Letting them live", *Future*, 4: 49-50 (1982).
17. Gopalan C.: "Studies on lactation is poor Indian communities", *Journal Trop. Pediatrics*, 4: 37-39 (1958).
18. Marine P.C.: "Letter to Editor", *Lancet*, 1: 232, 1984.
19. World Health Organisation: *The Quantity and Quality of Breast Milk - Report on the WHO Collaborative Study on Breastfeeding*, WHO, Geneva, 1985.
20. Habicht, J.P.: "Repercussion of lactation on nutritional status of mothers and infants." In: Chanez A. (ed.) *Proceedings of the Nineth International Congress on Nutrition*, Vol. 2, 106-114 , Bable, Karger, 1975.
21. United Nations: "Fertility behaviour in the context of development - Evidence from the World Fertility Survey", *Population Studies* No. 100, New York, 1987.
22. Ronald, L., and Kleinman, M.B.: "Fertlity transition in Latin America", *IPPF Medical Bulletin*, Vol.23, No.5, October 1989.
23. Anand, K.R.: "Inadequacy of breast milk - A myth or reality", (Editorial). *Indian Paediatrics*, 22(11): 797-800 (1985).

A MODEL TO STUDY THE SOCIO-CULTURAL DETERMINANTS OF FERTILITY : AN EXTENSION OF BONGAARTS' MODEL

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INTRODUCTION

There is a plethora of information on the analyses of fertility differentials by various socio-economic factors. These studies have succeeded in pointing out some of the socio-economic and psychological determinants of fertility. However, the entire picture of variables covering fertility behaviour in different cultural settings is not clear [1-3]. Moreover, only a few studies have attempted to explain the causal relationship between socio-cultural factors and fertility, which as a consequence, remains less well understood[4]. For instance, some studies speculate that socio-cultural changes, or degree of modernity, can create conditions which tend to increase fertility[5-7]. If this is so, there may be a positive relationship at the individual level between modernity and fertility. On the other hand, socio-cultural changes can create conditions which tend to increase contraceptive practice[8-11]. If so, when individuals or populations are classified on a scale of modernity, an inverse relationship between modernity and fertility may be found. Thus, relationships differ not only in magnitude but even in direction in different settings and at different times. Such a relationship between socio-cultural, economic and other determinants of fertility may help in understanding the causal relationship and in identifying factors that may be manipulated to influence fertility.

OBJECTIVES

In this paper, an attempt has been made to analyse socio-economic and other differentials in the proximate determinants of fertility, so as to separate the negative (fertility inhibiting) and positive (fertility-enhancing) influences of a variable on fertility. The effects of the four principal proximate determinants namely, the proportion married, use of contraception, induced abortion, and postpartum infecundability, have been separately studied by using a model which is an extension of the model proposed by Bongaarts and Potter[12]. Variations in the remaining proximate factors (natural fecundability, spontaneous intrauterine mortality and permanent sterility) generally have

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relatively little influence on fertility.

DATA AND METHODOLOGY

The following section presents a detailed analysis of a fertility differential model that quantifies the negative and positive effects of each of the socio-economic and cultural factors on fertility through various intermediate fertility variables. For illustration, the model is used to explain the observed socio-economic differentials in marital fertility in rural, south Gujarat.

The Fertility Differential Model

The following equations summarise the basic structure of the Bongaarts' model[12] by relating the fertility measures to the proximate determinants.

$$TFR = C_m \times C_c \times C_a \times C_i \times TF \quad \ldots\ldots (1)$$
$$TM = C_c \times C_a \times C_i \times TF \quad \ldots\ldots (2)$$
$$TN = C_i \times TF \quad \ldots\ldots (3)$$

where TFR is the total fertility rate,
TM is the total marital fertility rate
TN is the total natural marital fertility rate,
TF is the total fecundity rate

and C_m, C_c, C_a and C_i are the indices of marriage, contraception, induced abortion, and postpartum fecundability respectively. The indices can only take values between 0 and 1. When there is no fertility-inhibiting effect of a given intermediate fertility variable, the corresponding index equals 1, if the fertility inhibition is complete, the index equals 0. These indices can be estimated from measures of the proximate variables and these estimates are given below

$$C_m = \frac{m(a) \times g(a)}{g(a)} \quad \ldots\ldots (4)$$

where m(a) = age specific proportions currently married among females,

g(a) = age specific marital fertility rates.

$$C_c = 1 - 1.08 \times u \times e \quad \ldots\ldots (5)$$

where u = proportion currently using contraception among married women of reproductive age,

e = average use effectiveness of contraception.

$$C_a = \frac{TFR}{TFR + .4 \times (1+u) \times TA} \quad \ldots.(6)$$

where TA = total abortion rate.

$$C_i = \frac{20}{18.5 + i} \quad \ldots\ldots (7)$$

where, i = average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence

In order to understand the negative and positive effects of various socio-economic and cultural factors on fertility through each proximate determinant, the contribution of each to a given change in fertility has to be quantified. Bongaarts'[12] decomposition procedure was used to analyse the socio-economic differentials for dichotomous variables. Since socio-economic and cultural variables are likely to have two or more categories, the following procedure has been suggested to study fertility differentials:

Let TFR(k) be the total fertility rate for the k^{th} socio-economic group (k = 1,2, ... n, where n is the total number of subgroups of a variable), for which the decomposition of a trend in the TFR is desired. The decomposition of a trend in the TFR is based on the following equation (see equation 1 in the previous section for details):

$$TFR(k) = C_m(k) \times C_c(k) \times C_a(k) \times C_i(k) \times TF(k).....(8)$$

where, k = 1, 2, ... n

With a change in the TFR from TFR(1) in the first group to TFR(k) in k^{th} group and with simultaneous changes in the various proximate determinants of fertility, the ratio TFR(k)/TFR(1) can be expressed as

$$TFR(k) = \frac{C_m(k)}{C_m(1)} \times \frac{C_c(k)}{C_c(1)} \times \frac{C_a(k)}{C_a(1)} \times \frac{C_i(k)}{C_i(1)} \times \frac{TF(k)}{TF(1)} \quad \ldots(9)$$

The above equation (9) can easily be turned into a decomposition equation for estimating TFR(k) in the k^{th} group as a result of changes in each of the proximate determinants. Therefore, the adjusted TFR in the k^{th} group due to changes in the index of marriage (from $C_m(1)$ to $C_n(k)$), contraception ($C_c(1)$ to $C_c(k)$, abortion ($C_a(1)$ to $C_a(k)$) and postpartum infecundability (C(1) to $C_i(K)$, is respectively given by

$$TFR(k)_m = \frac{C_m(k)}{C_m(1)} \times TFR(1)$$

$$TFR(k)_c = \frac{Cc(k)}{C_c(1)} x\ TFR(1)$$

$$TFR(k)_a = \frac{C_a(k)}{C_a(1)} x\ TFR(1)$$

$$TFR(k)_i = \frac{C_i(k)}{C_i(1)} x\ TFR(1)$$

Similarly, the adjusted TFR in the k^{th} group due to changes in the remaining proximate variables, natural fecundability, spontaneous intrauterine mortality and permanent sterility, (from TF(1) to TF(k), is given by

$$TFR(k)_r = \frac{TF(k)_m}{TF(1)} x\ TFR(1)$$

Equation (9) can now be rearranged as

$$\frac{TFR(k)}{TFR(1)} - \frac{TFR(k)_m}{TFR(1)} x \frac{TFR(k)_c}{TFR(1)} x \frac{TFR(k)_a}{TFR(1)} x \frac{TFR(k)_i}{TFR(1)} x \frac{TFR(k)_r}{TFR(1)}$$

To obtain proportional change in TFR from TFR(1) to TFR(k), it is further defined as

$$P_f = \frac{TFR(k)}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k

$$P_m = \frac{TFR(k)_m}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k due to a change in the index of marriage

$$P_c = \frac{TFR(k)_c}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k due to change in the index of contraception

$$P_a = \frac{TFR(k)_a}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k due to a change in the index of induced abortion

$$P_i = \frac{TFR(k)_i}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k due to change in the index of postpartum infecundability

$$P_r = \frac{TFR(k)_r}{TFR(1)} - 1$$

= proportional change in TFR from group 1 to group k due to changes in the remaining proximate variables.

Following Bongaarts'[12] results, the equation (10) can now be expressed as

$$P_f = P_m + P_c + P_a + P_i + P_r + X \ldots\ldots (11)$$

where X represents an interaction factor which is a function of P_m, P_c, P_a, P_i and P_r and can be estimated simply by subtracting the sum of P_m, P_c, P_a, P_i and P_r from P_f. The above results would thus also allow the quantification of the contribution made by each proximate determinant to a given proportional change in fertility between group 1 and group k.

Illustration

The model has been illustrated using fertility survey data to explain observed socio-economic differentials in marital fertility in rural south Gujarat during 1980. Data from the south Gujarat survey (sampling design has been discussed elsewhere[14]) undertaken by the Population Research Centre, Baroda, was used in the absence of recent survey data which includes all the information necessary to analyse the socio-economic differentials in the proximate determinants of marital fertility. Since the aim was to explain the socio-economic differentials in marital fertility, the principal determinants of marital fertility were contraceptive prevalence, practice of induced abortion and the duration of postpartum infecundability. Since the incidence of induced

abortion is almost nil in the present sample, its index (C_a) equals 1. Thus, taking $C_m = 1$ and $C_a = 1$ in the earlier presentation, other indices and TF for each of the socio-economic groups are calculated and are given in Table 1. Finally the estimates of the indices and TF are used to calculate the adjusted total marital fertility rate (TMFR) in each socio-economic group as well as to calculate the different P factors.

RESULTS

The socio-economic variables selected for the present fertility differential analysis were caste/religion, education of husband, education of wife, occupation of husband, and annual income of the family. Other covariates (for example access to mass communications, ownership of modern goods or individual modernity) that we would like to have analysed are not included or were only partially available in the records of the project. Further, the categories of a variable made for the present study have been so defined that there are a sufficient number of cases to compute more or less stable TMFR. Therefore, in case of all variables, the categories are not sharp enough to reflect fertility differentials. Moreover, the variations in the socio-economic indicators are not large enough in the rural areas. Nevertheless, the variations in marital fertility between two extreme categories of a variable were to the extent of 9-33 per cent.

The level of TMFR, contraceptive practice, duration of postpartum infecundability as well as various indices of proximate determinants by various categories of selected socio-economic variables are shown in Table 1.

It is evident from Table 1 that all the selected variables have the expected pattern and the level of TMFR shows significant variation over the various categories of a predictor. For example, the level of TMFR has a tendency to decrease with an increase in the educational levels of the husband and wife. Similarly, family income was found to be negatively related with fertility. Among other variables considered, it is interesting to note that the fertility of manual workers was higher as compared to that of white collar workers. The observed socio-economic differentials in the proximate determinants were also in the direction one would expect from their trends during early phases of fertility transition.

The use of contraception has a tendency to increase with an increase in socio-economic status, while the duration of postpartum infecundability has a tendency to decrease. In other words, higher contraceptive prevalence levels and shorter duration of postpartum amenorrhoea are found among women belonging to higher socio-economic groups. Whether these differentials in the proximate determinants lead to higher or lower marital fertility in a socio-onomic group depends entirely on the size of the differences. As can be seen from Table 2, the observed socio-economic differential in marital fer-

TABLE 1

Total marital fertility rate (TMFR), proximate determinants and index of proximate determinants by selected socio-economic characteristics, south Gujarat

Socio-economic characteristics	Level of TMFR (TM)	Proportion currently using contraception (u)	Duration of post-partum infecunability (f)	Index of contraception (Cc)	Index of postpartum infecunddability (Ci)	Total fecundity rate (TF)
Caste/Religion						
Upper Caste Hindu	4.870 (898)*	.4883	8.69	.4854	.7356	13.6
Lower Caste Hindu	5.15 (919)	.4346	9.25	.5381	.7207	13.3
Other than Hindu	5.64 (171)	.3567	9.23	.6340	.7212	12.3
Education of husband						
Illiterate	5.51 (371)	.4162	11.09	.5531	.6759	14.7
Literate**	4.91 (1617)	.4604	8.57	.5160	.7388	14.4
Education of wife						
Illiterate	5.28 (865)	.4294	10.45	.5405	.6908	14.1
Literate**	4.78 (1103)	.4697	7.91	.5087	.7573	13.4
Occupation of husband						
White collar	4.74 (616)	4878	8.65	.4732	7366	13.6
Trader	4.76 (782)	.4565	8.35	.5197	.7449	12 3
Blue collar	5.65 (590)	.4143	10.40	.5560	.6920	14.7
Annual income						
Less than Rs. 6,000	5.69 (907)	.4338	10.22	.5364	.6964	15.2
Rs. 6,000-11999	4.61 (664)	.4495	8.66	.5287	.7364	11 8
Rs. 12,000 +	3.83 (417)	.4964	6.87	.4826	.7883	10.1
All women	5.02	.4522	9.06	.5226	.7257	13.2

* Figures in brackets denote the number of married women in each category.
** Further classification of the literate group does not increase variability in marital fertility.

tility was quite modest.

In the absence of the fertility enhancing impact of a shortening of the duration of postpartum infecundability and other factors, one would expect much lower than average marital fertility among higher socio-economic groups. However, none of the higher socio-economic groups had an adjusted TMFR of less than 4 as a result of higher contraceptive use (Table 2). Contraceptive

TABLE 2

Observed and adjusted total marital fertility rate by various selected socio-economic characteristics, south Gujarat

Socio-economic variable	Observed TMFR	Adjusted TMFR due to changes in index		
		Cc	Ci	Cr
Caste/Religion				
Upper Caste Hindu	4.87	4.32	5.75	6.24
Lower Caste Hindu	5.15	4.79	5.64	6.10
Other than Hindu	5.64	5.64	5.64	5.64
Education of husband				
Illiterate	4.91	5.14	6.02	5.40
Literate	5.51	5.51	5.51	5.51
Education of wife				
Illiterate	4.78	4.97	5.79	5.02
Literate	5.28	5.28	5.28	5.28
Occupation of husband				
White collar	4.74	4.81	6.01	5.23
Trader	4.76	5.28	6.08	4.73
Blue collar	5.65	5.65	5.65	5.65
Annual income				
Less than Rs. 6,000	3.83	5.12	6.44	3.78
Rs. 6,000-11999	4.61	5.61	6.02	4.42
Rs.12,000 +	5.69	5.69	5.69	5.69

practice in any socio-economic group cannot compensate for the fertility enhancing impact of other proximate determinants. Nevertheless, in the absence of contraception, the shortening of postpartum infecundability would have resulted in increased marital fertility, a TMFR of about 6 in the higher socio-economic groups.

A further study of Table 2 reveals that although the marital fertility difference is in the expected direction in case of the educational levels of the husband and wife, the difference in marital fertility between illiterate and literate groups is relatively small, indicating little effect of education in lowering fertility. Nevertheless, other selected variables showed a relatively larger variation as a result of the greater differentials in the use of contraception.

A further explanation for the observed socio-economic differentials in marital fertility is found from Table 3 which summarises a decomposition of the observed fertility difference into the contributions made by the various proximate variables.

The decomposition results presented in Table 3 clearly indicate how each of the selected socio-economic variables affect fertility, and the negative and positive effects of a predictor on fertility can be separated. For example, caste

TABLE 3

Decomposition of observed socio-economic differentials in marital fertility, south Gujarat

Socio-economic characteristics	Percentage of difference in TMFR due to factor				
	Contraceptive practice	Postpartum infecund-ability	Other proxi-mate deter minants	Inter-action	Total difference
Caste/Religion	—23.40	1.95	10.64	—2.84	—13.65
Education of husband	— 6.72	9.26	— 2.00	—11.43	—10.89
Education of wife	— 5.87	9.66	— 4.92	— 8.34	— 9.47
Occupation of husband	—14.87	6.37	— 7.43	— 0.18	—16.11
Annual income	—10.02	13.18	—33.57	— 2.28	—32.69

* The decomposition results are obtained by taking the observed differences in TMFR between two extreme categories of a variable. Similarly, decomposition of observed socio-ecnomic differentials in marital fertility between any two categories of a variable can be obtained.

and religion still appear to be an important determinants of a couple's fertility; upper caste Hindus had a relatively lower fertility as compared to their lower caste counterparts and groups other than Hindu. In order to achieve social status and new ways of life, children become less important. Upper caste Hindu couples practice family planning to a greater extent than other groups. However, socio-economic changes also influence the level of modernisation of individual couples.

Modernisation in the process of removing socio-cultural checks on fertility[1], reduces the practice of prolonged breastfeeding and in turn postpartum infecundability. There is a monotonic negative association between socio-economic factors and the period of breastfeeding in less developed countries[15]. Thus, there is higher contraceptive prevalence and shorter duration of postpartum amenorrhoea among upper caste Hindu women. Since the fertility inhibiting effect of higher contraceptive use is sufficient to compensate for the decline in postpartum infecundability and for the positive effect of other proximate determinants, lower marital fertility is found among upper caste Hindus. The observed 13.7 per cent lower marital fertility among upper caste Hindus as compared to non-Hindu groups can be decomposed into the fertility inhibiting effect of —23.4 per cent due to higher contraceptive use among upper caste Hindus and a fertility enhancing effect of 2 per cent due to shortened duration of postpartum infecundability among upper caste Hindus. The differentials in the remaining proximate determinants together added 10.6 per cent and the interaction factor equalled —2.8 per cent.

The negative and positive effects of a variable on fertility with respect to the other socio-economic variables, can be similarly assessed from Table

3. It is evident that the husband's occupation and family income are also important in causing favourable changes in fertility by offsetting the fertility-enhancing effect of modernisation. It is however surprising to note that education of husband and wife had little effect on fertility because of a very modest differential in contraceptive prevalence combined with a relatively large difference in postpartum infecundability. In explaining the observed differentials in marital fertility, the contribution of the remaining proximate determinants viz., natural fecundability, spontaneous intrauterine mortality and permanent sterility, is, as expected, relatively small in the case of all the socio-economic variables except family income. In the case of family income, the differentials in relation to the other proximate determinants surprisingly contributed a very large proportion (33 per cent) to the fertility differential. This was perhaps caused by a greater use of abstinence, coitus interruptus and rhythm methods among the high income groups; these practices had probably not been reported by the couples as they are not viewed as "true" contraceptives by them or to avoid embarrassment.

The overall results clearly indicate the influence of the selected socio-economic variables in explaining the fertility behaviour of couples. The intervention made by the national family planning programme, with a greater emphasis on the adoption of terminal methods, which could not be introduced into the model as a factor, might be responsible for weakening the influence of socio-economic variables particularly education, on fertility. It may be noted that the majority of the couples in the present sample are acceptors of terminal methods (41 per cent out of 45 per cent users of all methods) and such methods are popular more among illiterate and lower socio-economic groups. On the other hand, spacing methods are more popular among the educated and higher socio-economic groups. Nevertheless, the results still seem to indicate that socio-economic changes had an effect in reducing marital fertility in rural south Gujarat. However, this decline in fertility was rather slow as a result of the initial fertility-increasing effects of modernisation. Unless such fertility-increasing effects are fully counterbalanced by the use of contraception, socio-economic changes cannot be expected to show a rapid decline in fertility.

SUMMARY AND CONCLUSION

This paper analyses socio-economic and other differentials in the proximate determinants of fertility by separating the negative or fertility inhibiting and positive or fertility-enhancing influence of a variable on fertility. This is achieved by using an extension of the decomposition model suggested by Bongaarts for studying the proximate determinants of fertility. The present model has been illustrated using data from a 1980 fertility survey of rural south Gujarat for explaining the observed socio-economic differentials in

marital fertility through its three principal determinants namely, contraceptive prevalence, practice of induced abortion and the duration of postpartum infecundability. Since the incidence of induced abortion was almost nil in the present sample, the effect of contraceptive prevalence, postpartum infecundability and other proximate determinants (natural fecundability, spontaneous, intrauterine mortality and permanent sterility) and their interactions were examined to separate the positive and negative effects of various socio-economic factors on fertility.

The results clearly indicate the influence of caste/religion, education of husband, education of wife, occupation of husband and annual income of the family in explaining the fertility behaviour of couples. The couple's religion/caste; husband's occupation and family income were also important in causing favourable changes in fertility by offsetting the fertility- enhancing effect of modernisation. It is however surprising to note that education of husband and wife had little effect on fertility because of a very modest differential in contraceptive prevalence combined with relatively large differentials in postpartum infecundability. Nevertheless, the results still seem to indicate that socio-economic changes had an effect in reducing marital fertility in rural south Gujarat. However, the decline in marital fertility was rather slow as a result of the initial fertility-enhancing effect of such socio-cultural changes. Unless the fertility increasing effects of such modernisation are fully counterbalanced by the use of contraception, socio-economic changes cannot be expected to show low fertility behaviour quickly.

REFERENCES

1. Das, N.P.: "Socio-cultural determinants of fertility: The case of India". In: B.N. Saxena et al. (eds.), *Socio-cultural Determinants of Fertility*, Indian Council of Medical Research, New Delhi, 1985.
2. Mahadevan, K.: "Sociology of fertility". In: *Determinants of Fertility Differential in South India*, Sterling Publishers Pvt. Ltd., New Delhi, 1979
3. Mahadevan. K.: *Population Dynamics in Indian States*, Mittal Publications, New Delhi, 1989.
4. Nag, M.: "Alternative routes of fertility and mortality decline: A study of Kerala and Punjab". In: S.N. Singh et al. (eds.) *Population Transition in India*, Vol. 1, B.R. Publishing Corporation, Delhi, 1989.
5. Mandelbaum, D.G.: *Human Fertility in India: Social Components and Policy Perspectives*, Oxford University Press, Oxford, U.K., 1974.
6. Nag, M. 1980: "How modernisation can also increase fertility", *Current Anthropology* 21 (4) : 571-87 (1980).
7. Srinivasan, K., Reddy, P.H. and Raju, K.N.M.: *Changes Over a Generation in Fertility Levels and Values in Karnataka : A Comparison of Salient Findings from the Mysore Population Study (1951) and the Bangalore Population Study (1975)*, mimeographed. India Population Project, Karnataka, Bangalore, 1977.
8. Caldwell, J.C.: "Mass education as a determinant of the timing of fertility decline". *Population and Development Review* 6(2): 225-255 (1980).

9. Cutright, P.: "The ingredients of recent fertility decline in developing countries", *International Family Planning Perspectives* : 9 (4) : 101-109 (1983).
10. Holsinger, D.P. and Kasarda, J.D.: "Education and human fertility: Sociological perspectives". In: R.G. Ridker (ed.) *Population and Development*, The Johns Hopkins University Press, Baltimore, 1976.
11. Murthy, K.R. and Rao, N.U.: "Female education, modernity and fertility: A study in the Indian context", *Demography India*, 12(1): 86-97 (1983).
12. Bongaarts, J. and Potter, R.G.: *Fertility, Biology and Behaviour: An Analysis of Proximate Determinants*, Academic Press, New York, 1983.
13. Davis , K. and Blake, J.: "Social structure and fertility: An analytical framework", *Economic and Cultural Change*, 4: 211-35 (1956).
14. Gandotra, M.M. and Das, N.P.: *Infant Mortality and Its Causes*, Himalaya Publishing House, New Delhi, 1988.
15. Nag, M.: "The impact of socio-cultural factors on breastfeeding and sexual behaviour". In: R.A. Bulatao and R.D. Lee (eds.), *Determinants of Fertility in Developing Countries*, Vol. 1 *Supply and Demand for Children*, Academic Press, New York, 1983.

WOMEN'S PERCEPTION OF TIME IN RURAL INDIA: POSSIBLE IMPLICATIONS FOR FAMILY WELFARE PROGRAMMES

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INTRODUCTION

The recording of time-related data is an important part of any management information system for family welfare. The correct age in years, the age at menarche, the date of the last menstrual period, the expected date of delivery, and the date of birth of children are some of the important events about which women are often questioned. But a basic question which arises is: are our illiterate, simple women in rural areas conscious of time in terms of dates and months on the modern calender ? How many women would be able to say, "Today is 23rd July, 1990" ?

Of course, all men and women are conscious of the continuous flow of time, although its physical nature may be a profound mystery. Following the widespread availability of the calender and the watch, time has acquired a new meaning for the sophisticated city dweller. It is precisely measurable and seems to move ahead relentlessly like a shooting arrow. A particular time on a particular date will never return again and is, therefore, absolutely unique. On the other hand, for the common villager, time is essentially a cycle of events which is repeated each year - the change of seasons, the sowing and harvesting of crops, and the festivals recurring at regular intervals.

OBJECTIVES

In the rural context then, in an apparently endless repetitive cycle, how important are dates and years, particularly to the women folk? How do they recollect time-related events in their own personal life ? This preliminary study was conducted to see how time is viewed by our village women and how good is their calender-sense since this can have considerable implications in the management of their reproductive functions.

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SAMPLE AND METHODOLOGY

The study was carried out in three different Primary Health Centre (PHC) areas in Rajasthan state, namely, Phagi (Jaipur), Badgaon (Jalore) and Bhaisroadgarh (Chittorgarh). A structured questionnaire was prepared in Hindi which had only four simple and straight-forward questions:

1. Can you tell what day is today ?
   Day, Date, Month and Year
2. What is your age ? When were you born ?
3. When was your youngest child born ? Do you remember his/her date of birth ?
4. On which date does our Republic Day fall ?

A total of 300 women from the three PHC areas were randomly selected and interviewed. Care was taken to record the spontaneous verbal responses to the questions in the respondents's own words, as far as possible.

RESULTS

More than 90 per cent of the respondents were totally illiterate, while the remaining seemed to have gone to a school but only upto Standard 2 or 3. The sample, therefore, was fairly uniform as far as literacy and education are concerned.

Day and Date 'Today'

All the women were pointedly asked to tell the day, date, month and year when the interview was being taken. The response was somewhat complex because of two different calendars (Indian and Gregorian or modern) as well as two different languages (Hindi and English) being used. For example, the year was indicated according to the modern calender but the numerals were in Hindi. The distribution of women according to their calender sense after sorting out these complexities is shown in Table 1.

TABLE 1

Percentage distribution of respondents by their knowledge regarding day, date, month and year

	Indian calender	Modern calender	No knowledge
Day	76.6	—	23.4
Date	60.8	10.0	29.2
Month	74.1	10.5	19.4
Year	0	28.0	72.0

Obviously, more than 75 per cent of the respondents could correctly tell the day in Hindi (Somwar, Mangalwar and so on). The date was largely men-

tioned according to the Indian calender (Akadeshi, Chauth, Poonam etc.). The months were correctly identified according to the Indian calender by about 74 per cent of the respondents (Bhadwa, Ashodh etc.) and 10 per cent of these could even name the month according to the modern calendar, i.e. July, August etc. However, no one could give the year according to the Indian Calender.' Only a third were aware of the year at all; they indicated it according to the modern calender using Hindi numerals (Unnees Sau Navasi).

Age

Although none of the respondents was able to specifically state her age in years, some could compute it within a range of five years after some probing. Age at marriage and age of eldest child were the most commonly used reference points. Women who were fairly precise about their present age constituted only 5.7 per cent of the total respondents. On the other hand, 145 or 48.3 per cent of the respondents were unable to specify their age in years, their vagueness and uncertainty extending over ten years or more. None could give their date of birth as we expect it i.e. date, month and year. On the basis of their own assessment the age distribution of the 300 respondents is shown in Table 2.

TABLE 2

Age-wise distribution of respondents

Age as stated by the women in years	% of respondents
15-19	4.0
20-24	11.2
25-29	9.0
30-34	11.2
35+	16.3
Uncertain	48.3
Total	100.0

No attempt was made to verify the age of the women nor was it the purpose of the present study. In any case, it is not easy to establish the age of adults with any precision. What we were concerned about was the importance that rural women attached to this age reckoning and if they at all cared to remember their date of birth.

Date of birth of youngest child

We also tested the ability of rural women to recall the date of birth of the youngest child (Table 3).

TABLE 3

Percentage distribution of respondents by their ability to recall the date of birth of the youngest child

	Indian calender	Modern calender	No knowledge
Day	53.8	4.5	41.8
Date	41.9	1.8	56.3
Month	54.5	0.9	34.6
Year	0	29.4	70.6

It was really surprising that even when the last born child was himself/herself an adult, the mother could not indicate specifically the day and month on which he/she was born. This was all according to the Indian calender; those who could recall the event according to the modern calender formed a negligible proportion. However, when it came to the year of birth of the last child, 70 per cent were unable to identify it at all. The 30 per cent who did recollect the year of birth all used the modern calender with Hindi numerals.

National Day

The importance which rural women attach to the calender was also tested for a non-personal event i.e. our Republic Day. Interestingly, the respondents were able to comprehend this national occasion only as the day when the flag is hoisted in the village school. Only 38.2 per cent of the respondents could approximately tell the month by the Indian calender during which the flag hoisting takes place. The remaining had no idea.

Incidentally, all the respondents were also asked who was the Chief Minister of Rajasthan. Only two of the 300 could correctly name the Chief Minister; many thought it was Rajiv Gandhi and the others had no idea.

DISCUSSION

This study has to be viewed against the background of female literacy in Rajasthan which is one of the lowest in the country. The 1981 census showed that only 5.46 per cent of the rural women could be counted as literate. Careful interaction with 300 or these rural women regarding their perception of time has brought out the following facts :

1. Calender-sense, or remembering dates and years, is considered by these women to be essentially a concern of the menfolk. They view their own lives as simply repetitive and bound down to a daily domestic routine.

2. It appears that rural women are only concerned about remembering the day and month of events which are important in their personal life but they

have no count of the years. That is why they may correctly recall the day and month on which a child was born, or a festival is celebrated, but they cannot recall the time in years that has elapsed after the event.

3. Some complexity and confusion arises because we have two calenders in use. Days are counted only by their Hindi names; months are remembered sometimes according to the Indian calender and sometimes according to the modern Gregorian calender. The recollection of the year is very vague and a confusing use is made of both (there is a difference of 58 years in the Vikram Samwat and Christian era). Women are unconcerned about the year and look up to their menfolk to do whatever computation they will to fix any event in relation to the year of occurrence.

4. Interestingly enough, calenders are still a rarity in rural homes, at least in Rajasthan. None of the 300 women could present one before the study team. (They, however, knew that the village priest has the Indian "Panchang" and Government establishments, like schools and health centres do display the English calender). Men, however, have started using wristwatches and many of these show the day and date. The marked proliferation of cheap electronic watches is, therefore, indirectly contributing to a better calender-sense, at least amongst the men.

5. Obviously, a large variation in the recollection of the year of occurrence of any particular event is unavoidable in a rural setting. A management information system based on the year of marriage, age of children, date of last menstrual period, date of birth etc. must take this into account. The basic fact is that the rural women see no use in remembering the years. Any event important to them - the birth of a child or a religious ritual to be observed - is identified by the day and month; the rest appears to them as a cyclic repetition of the same.

6. The fact that none of the 300 respondents could correctly name the Chief Minister should be a sobering thought for all politicians

In conclusion, educating the rural women for a better reckoning of dates and years can greatly help in a more efficient management of their fertility. Calenders can be a very simple and useful tool for demarcating the period of maximum fertility, safe period, early conception amenorrhoea, abnormalities related to delayed or early menarche and menopause, proper birth spacing etc. At the same time it would also be interesting to see if there are any gender-based differences in time perception.

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KNOWLEDGE AND PRACTICE OF FAMILY PLANNING IN ONGOLE TALUK OF PRAKASAM DISTRICT IN ANDHRA PRADESH

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INTRODUCTION

Family planning is an effective way of avoiding high risk pregnancies and ensuring responsible parenthood. It improves the health of the women by enabling them to have a few children. Having a large number of children increases the mothers' and children's risk of illness or death. Women who become pregnant while they are still very young run a much greater risk of complications during pregnancy and child birth than do women in their twenties. These complications can cause damage to their health or even their lives. The same is true of women who become pregnant at the end of their reproductive years. In this context, it becomes essential to assess people's knowledge, attitude and practice of family planning methods so as to develop programmes for enhancing such knowledge and creating a demand for services thereby reducing high risk pregnancies and inculcating a sense of responsible parenthood among couples.

OBJECTIVES

The main objective of this paper was to asses the knowledge and practice of women about family planning methods in relation to their status as responsible parents.

SAMPLE AND METHODOLOGY

The study was conducted in Ongole Taluk in Prakasam district of Andhra Pradesh. The cluster random sampling technique was used - at the first stage, the taluk was divided into two groups: urban - comprising the only town area in the taluk, namely Ongole town, and rural. Using a field map of Ongole town, its 58 wards were divided geographically into four divisions. One ward was randomly selected from each division, from which 50 currently married women in the reproductive age group, with or without children, formed the study sample. Thus, the total urban sample was 200. The 48 villages of Ongole taluk were similarly divided into four geographical areas with the

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help of the taluk map of the 1981 census. One hundred currently married women in the reproductive age group with or without children were selected from a randomly selected village from each geographic area. The list of currently married women is available with the ANM and the same was used as a sampling frame. The sample size in the rural area was 400, the total sample size then being 600.

With the help of a scoring technique the women were classified into three categories: 1) "not responsible"; 2) "moderately responsible"; and 3) "responsible" parents. Different variables were considered to determine the status of responsible parenthood separately for women with children and those without children. The variables used for determining the status of responsible parenthood for women without children were: ideal age at marriage for boys, ideal age at marriage for girls, ideal interval between marriage and first conception, desired number of children, continuing childbearing till a son is born, favourable attitude towards sex education for children, necessity of family life education, knowledge of birth spacing that leads to better health and reduces infant mortality, ideal interval between one pregnancy and the successive pregnancy, knowledge of nutritious food during pregnancy and lactation.

The variables considered for women with children were the above and 14 others namely, aspiration for the education of sons, aspiration for the education of daughters, aspiration for the employment of sons, aspiration for the employment of daughters, favourable attitude towards extracurricular activities for children, encouraging children to participate in sports and games, special diet given to children, regular health check up at the time of pregnancy, period of breastfeeding, services utilised at the time of morbidity of children, services utilised at the time of morbidity of mother, immunisation of children, family planning adoption, desire to use a family planning method.

The minimum and maximum scores for each variable/item was zero (0) and two (2) respectively on a three-point scale. The score value was assigned depending upon the answers provided by the women for each of the 24 questions. Based on the score values, the women were classified into:

1. "Not responsible" parents: Women who scored 49 per cent or less of the total score value.
2. "Moderately responsible" parents: Women whose score value lay between 50 per cent to 59 per cent.
3. "Responsible" parents: Women who scored 60 per cent and above.

A similar scoring technique has been followed by the Population Crisis Committee[1] for ranking 99 countries representing 92 per cent of the world's female population on the basis of the status of their female population.

The relationship between knowledge, opinion and attitude of the women towards different aspects of family planning practices and the status of respon-

sible parenthood was examined. In addition to the usual KAP assessment of family planning, an effort was also made to elicit the opinions of the women as to whether they would use contraceptive methods to avoid health hazards either to themselves or to their children. The study sample comprised of 90 women without children and 510 women with children. Among those with children, 301 were acceptors of family planning, the remaining 209 being non-acceptors.

RESULTS AND DISCUSSION

Of the total sample, 263 women were classified as "not responsible", 224 as "moderately responsible", and 113 as "responsible" parents.

Knowledge of Birth Control Methods

When asked which family planning method they knew of, all the women were observed to know the various family planning methods (both permanent and temporary) by their popular names.

Incentives for Sterilisation

In response to the question, "What incentives do you think would attract people to adopt sterilisation ?", about 65 per cent of urban women and 95 per cent of rural women mentioned "money" as a good incentive. Only 23 per cent of urban and 2.5 per cent of rural women felt that "permanent increments or benefits to the family would encourage couples to limit family size. The remaining 12.0 per cent of urban women and 2.5 per cent of rural women felt "money/clothes/medicines/food/job opportunities/and better educational facilities for children" to be the right kind of incentives. Only one urban woman said: "Sterilisation is not for the sake of incentives". Six urban and one rural women stated that money was not an attractive incentive for promoting sterilisation.

Ever Use of Family Planning Methods

Only one (0.4 per cent) of the 263 women in the "not responsible" group had ever used a family planning method. Ever use rose to 2.7 per cent among the "moderately responsible" group, and was highest (16.8 per cent) in the "responsible" group of women. Overall, past use of contraception was about 4.3 per cent.

Current Family Planning Acceptors

About half of the currently married women had adopted either a permanent or a temporary method of family planning (Table 1).

As observed from Table 1, family planning acceptance was highest among "responsible" women (73.5 per cent), followed by "moderately responsible"

TABLE 1

Distribution of women by current family planning practice and status of responsible parenthood

Status of parenthood	Urban		Rural		Total	
	Total	Current FP users	Total	Current FP users	Total	Current FP users
"Not responsible"	56	23(41.1)	207	72(34.8)	263	95(36.1)
"Moderately responsible"	77	45(58.4)	147	78(53.1)	224	123(54.9)
"Responsible"	67	50(74.6)	46	33(71.7)	113	83(73.5)
Total	200	118(59.0)	400	183(45.8)	600	301(50.2)

Figures in brackets denote percentages.

women (54.9 per cent), and "not responsible" women (30.1 per cent). Both urban and rural women showed a similar trend in acceptance. The difference between "responsible" women and "not responsible" was found to be significant (Z=3.8) at a 1 per cent level of probability in the case of rural women. The records available with the District Medical and Health Office, Ongole for 1985-86, show sterilisation acceptance to be 43.2 per cent in Ongole town, and 43.3 per cent in Ongole taluk - 43.2 per cent in urban and 43.3 per cent in rural areas. The corresponding figure for Prakasam district was 35.1 per cent; 39.1 per cent in urban and 34.7 per cent in rural areas.

The acceptance of family planning (both permanent and temporary methods) was very high in the study area. This may be because Ongole taluk is the most advanced taluk (agriculturally and industrially) in Prakasam district, and can be easily compared to any developed taluk of Andhra Pradesh. It possesses better medical, educational and transport facilities than any other town in the district[2].

The findings in relation to current use of family planning (Table 2) showed that as many as three-fourths of the women (83.1 per cent) had adopted tubectomy, followed by vasectomy (13.0 per cent) and temporary methods (4.0 per cent), both in rural and urban areas.

The acceptance of tubectomy was highest (88.6 per cent) among "moderately responsible" women as compared to their "not responsible" (80.0 per cent) and "responsible" (78.3 per cent) counterparts. While the highest adoption of tubectomy in the rural sample was among the "responsible" women (90.9 per cent), followed by the "moderately responsible" (89.7 per cent) and "not responsible" (80.6 per cent) women, among urban women, tubectomy was most accepted by the "moderately responsible" (86.7 per cent) and least 70.0 per cent) by the "responsible" groups of women.

An analysis of current family planning acceptors by number of living children indicated that the majority had 3-4 living children (55.8 per cent),

TABLE 2

Distribution of current family planning acceptors by method and status of responsible parenthood

Status of parenthood	URBAN				RURAL				TOTAL			
	Tubec-tomy	Vasec-tomy	Spacing method	Total	Tubec-tomy	Vasec-tomy	Spacing method	Total	Tubec-tomy	Vasec-tpmy	Spacing method	Total
"Not. responsible"	18 (78.3)	5 (21.7)	) (100.0)	23 (80.6)	58 (15.8)	11 (4.2)	3 (100.0)	72 (80.0)	76 (16.8)	16 (3.2)	3 (100.0)	95
"Moderately responsible"	39 (86.7)	3 (6.7)	3 (6.7)	45 (100.0)	70 (89.7)	8 (10.3)	(100.0)	78 (88.6)	109 (8.9)	11 (2.4)	3 (100.0)	123
"Responsible"	35 (70.0)	9 (18.0)	6 (12.0)	50 (100.0)	30 (90.0)	3 (9.1)	) (100.0)	33 (78.3)	65 (14.5)	12 (7.2)	6 (100.0)	83
Total	92 (77.0)	17 (14.4)	9 (7.6)	118 (100.0)	158 (86.3)	22 (12.0)	3 (1.6)	183 (100.0)	250 (83.1)	39 (13.0)	12 (4.0)	301 (100.0)

Figures in brackets denote percentages. Figures in brackets denote percentages.

TABLE 3

Distribution of current family planning acceptors by number of living children and status of responsible parenthood

Status of parenthood	Number of children											
	2 or >2	3 - 4	5 +	Total	2 or >2	3 - 4	5 +	Total	2 or >2	3 - 4	5 +	Total
"Not responsible"	5 (21.7)	13 (56.5)	5 (21.7)	23 (100.0)	11 (15.3)	48 (66.7)	13 (18.1)	72 (100.0)	16 (16.8)	61 (64.2)	18 (18.9)	95 (100.0)
"Moderately responsible"	11 (24.4)	30 (66.7)	4 (8.9)	45 (100.0)	25 (32.1)	47 (60.3)	6 (7.7)	78 (100.0)	36 (29.3)	77 (62.6)	10 (8.1)	123 (100.0)
"Responsible"	23 (46.0)	26 (52.0)	1 (2.0)	50 (100.0)	28 (84.8)	4 (12.1)	1 (3.0)	33 (100.0)	51 (61.4)	30 (36.1)	2 (2.4)	83, (100.0)
Total	39 (33.1)	69 (58.5)	10 (8.5)	118 (100.0)	64 (35.0)	99 (54.1)	20 (10.9)	183 (100.0)	103 (34.2)	168 (55.8)	30 (10.0)	301 (100.0)

Figures in brackets denote percentages.

TABLE 4

Distribution of non-acceptors by reason for not accepting family planning and status of responsible parenthood

Status of parenthood	Urban				Rural				Total			
	Want more children	Preparing to adopt FP	Other	Total	Want more children	Preparing to adopt FP	Other	Total	Want more children	Preparing to adopt FP	Other	Total
"Not responsible"	6 (25.0)	2 (8.3)	16 (66.7)	24 (100.0)	22 (23.2)	5 (5.3)	68 (71.6)	95 (100.0)	28 (23.5)	7 (5.9)	84 (70.6)	119 (100.0)
"Moderately responsible"	8 (40.0)	3 (15.0)	9 (45.0)	20 (100.0)	29 (55.8)	6 (11.5)	17 (32.7)	52 (100.0)	37 (51.4)	9 (12.5)	26 (36.1)	72 (100.0)
"Responsible"	11 (78.6)	3 (21.4)	)	14 (100.0)	4 (100.0)	)	)	4 (100.0)	15 (85.3)	3 (16.7)	) (100.0)	18
Total	25 (43.1)	8 (13.8)	25 (43.1)	58 (100.0)	55 (36.4)	11 (7.3)	85 (56.3)	151 (100.0)	80 (38.3)	19 (9.1)	110 (52.6)	209 (100.0)

'Other' includes "No chance of pregnancy", fear of complications and side effects. lack of help at home to go to the hospital to get sterilisation, and fear of death.

Figures in brackets denote percentages.

34.2 per cent had two or less, and 10 per cent had five or more children (Table 3). This trend held good for both urban and rural areas.

While as many as three-fifths (61 per cent) of the "responsible" acceptors had two or fewer children, slightly over three-fifths of the "moderately responsible" and "not responsible" women acceptors had 3-4 children (Table 3). This was noticed in both urban and rural areas. Surprisingly, while as many as 84.8 per cent of the "responsible" rural acceptors had two or fewer children, only 46 per cent of their urban counterparts had this family size. Khan and his co-workers[3] have reported that low parity couples have begun to accept family planning.

Encouragement/Discouragement to adopt Sterilisation

Ninety seven per cent of urban women and 98 per cent of rural women reported that they had neither been encouraged nor discouraged by anybody to accept sterilisation. The remaining women said that they had been discouraged by their husbands from adopting sterilisation.

Experience of Side Effects

Side effects were reported by a very negligible number of both ever and current users of family planning - only five women from urban and eight women from the rural sample mentioned side effects such as "stomach ache, early menstruation, white discharge, weakness, waist pain, headache" etc.

Most Satisfactory Method

Tubectomy was reported as the most satisfactory permanent family planning method by 48.5 per cent of urban and the majority (81.3 per cent) of the rural women. About 40 per cent of urban and 16.1 per cent of rural women could not answer this question, while in the case of the most satisfactory temporary method, over four-fifths (80 per cent urban and 88.5 per cent rural) did not know the answer. Among all temporary methods, "Nirodh" was reported as the most satisfactory method by 10.5 per cent of urban women, while an equal proportion of rural women considered the oral pill as most satisfactory.

Reasons for Non-acceptance of Family Planning

About 38.3 per cent of the 299 non-acceptors of family planning expressed "the desire for an additional child or more children" as the reason for not practicing family planning (Table 4).

About half (52.6 per cent) of them gave other reasons such as "no chance of further pregnancy", fear of complications or side effects, lack of help at home to be able to go to the hospital for sterilisation, fear of death, etc., while the remaining 9 per cent stated that they were now ready to accept sterilisation.

A very large proportion of "responsible" women (83.3 per cent) as compared to "moderately responsible" (51.4 per cent) and "not responsible" women (23.5 per cent) expressed the desire for more children as the main reason for not practicing contraception. The association between desire for an additional child and residence (urban/rural) was not significant (z=1.5 at 1.0 per cent level of probability). In Omran's study[4], the main reasons for not practicing family planning was the desire for more children, husband's disapproval, mother-in-law's objections and fear of harm to the mother's health.

Willingness to Practice Family Planning for Health Reasons

Table 5 indicates that 77.5 per cent of the non-acceptor women were willing to accept a family planning method if told by a physician that further pregnancies would harm either their own health or the health of the child.

TABLE 5

Distribution of non-acceptors by status of responsible parenthood and willingness to accept family planning for mother's/child's health on doctor's advice

Status of parenthood	Urban: Total non-acceptors	Urban: Willing to accept FP	Rural: Total non-acceptors	Rural: Willing to accept FP	Total: Total non-acceptors	Total: Willing to accept FP
"Not responsible"	24	17(70.8)	95	73(76.8)	119	90(75.6)
"Moderately responsible"	20	20(100.0)	52	35(67.3)	72	55(76.4)
"Responsible" parents	14	14(100.0)	4	3(75.0)	18	17(94.4)
Total	58	51(87.8)	151	111(73.5)	209	162(77.5)

Figures in brackets denote percentages.

As seen from Table 5, the willingness to practice contraception for health reasons was greater among "responsible" women (94.4 per cent) than among "moderately responsible" (76.4 per cent) and "not responsible" women (75.6 per cent). In the urban sample, it was 100 per cent among "responsible" and "moderately responsible" women and 70.8 per cent among "not responsible" women.

Rural women were found to be less likely to accept contraception even on the advice of a doctor (73.5 per cent) as compared to urban women (87.9 per cent). The difference was significant at a one per cent level of probability (z=3.7). In his study, Omran[4] has reported that an impressive majority of women approved of the use of contraception on doctor's advice.

Potential Acceptors

The women were also questioned with a view to finding out if they had

TABLE 6

Distribution of women by desire to use family planning by living children and status of parenthood

Status of parenthood	Number of living children: 1 child		2 children		3/3+ children		Total	
	Total non-adopters	Total potential adopters	No. of non-adopters	No. of potential adopters	No. of non-adopters	No. of potential adopters	No. of non-adopters	No. of potential adopters
"Not responsible"	52	8(15.4)	31	19(61.3)	36	8(22.2)	119	35(29.4)
"Moderately responsible"	41	25(61.0)	14	12(85.7)	17	7(41.2)	72	44(61.1)
"Responsible"	7	7(100.0)	10	10(100.0)	1	1(100.0)	18	18(100.0)
Total	100	40(40.0)	55	41(74.5)	54	16(29.6)	209	97(46.4)

Figures in brackets denote percentages.

any intention of practicing contraception in the future, and if so, which method and at what stage of their reproductive life. Table 6 reveals that almost half of the non-acceptors (46.4 per cent) were interested in practicing contraception in the near future. As many as 75.5 per cent of non-acceptors with two children were desirous of accepting a family planning method as compared to non-acceptors with one child (40.0 per cent), and three or more children (29.6 per cent).

At each parity level, the proportion of those wishing to adopt family planning decreased as the status of responsible parenthood decreased from "responsible" to "moderately responsible" to "not responsible". Among the "responsible" non-acceptor group, all the women expressed a desire for accepting a method irrespective of parity. Among the "moderately responsible" group, a high 61 per cent of women with one child and 85.7 per cent of those with two children wished to practice family planning. Interestingly, as many as 61.3 per cent of "not responsible" non- acceptors too were desirous of planning their families.

Table 7 reveals that most of the non-acceptors who wished to accept some form of contraception wanted to do so after having one additional child (67.0 per cent), while 15.5 per cent wished to have two more children before accepting a method, and 17.5 per cent were preparing to adopt sterilisation. The most favoured method was tubectomy as stated by both urban and rural potential acceptors.

TABLE 7

Distribution of potential acceptors by status of responsible parenthood and after how many children they would adopt family planning

	Urban + Rural			
Status of parenthood	After one child	After two child	Shortly	Total
"Not responsible"	20 (57.1)	8 (22.9)	7 (20.0)	35 (100.0)
"Moderately responsible"	32 (72.7)	5 (11.4)	7 (15.9)	44 (100.0)
"Responsible"	13 (72.2)	2 (11.1)	3 (16.7)	18 (100.0)
Total	65 (67.0)	[illegible]	17 (17.5)	97 (100.0)

[illegible]

SUMMARY AND CONCLUSION

Almost all women interviewed were aware of the different types of family planning methods (both temporary and permanent) and also knew their popular names. As many as 95 per cent of rural women thought that money was an appropriate incentive for promoting sterilisation while only 65 per

cent of their urban counterparts shared this opinion. "Responsible" women were more likely to have used a family planning method in the past as compared to those who were "moderately responsible" or "not responsible". About half of the women were currently practicing family planning. Again more "responsible" women (70 per cent) were current acceptors as compared to the other two categories. Tubectomy was the most popular method adopted by adopted by 83.0 per cent, followed by vasectomy (13.0 per cent) and temporary methods (4.0 per cent). More "moderately responsible" women had adopted tubectomy as compared to "responsible" and "not responsible" women. However, more "responsible" women of lower parity were practicing family planning than the "moderately responsible" and "not responsible" women.

A negligible proportion of the acceptors had experienced any complications or side effects as a result of contraceptive use. Tubectomy was mentioned as the most satisfactory permanent birth control method both in urban and rural areas, while among temporary methods, Nirodh was found to be the most satisfactory method by urban women and the pill by rural women. About 46 per cent of those who were not practicing family planning expressed a desire to do so in the near future; all "responsible" women among non-acceptors wished to practice contraception. Thus, meeting the expressed demand and inculcating a sense of responsible parenthood among couples, and in particular women, through appropriate educational programmes emphasising the health benefits of family planning for mothers and children would make a positive contribution to the family planning programme.

REFERENCES

1. Population Crisis Committee: *Population Briefing Paper*, No. 20, June 1988, Washington D.C., USA.
2. Census of India, 1981. Series 2, Andhra Pradesh *District Census Handbook—Prakasam*. Published by Government of Andhra Pradesh, 1986.
3. Khan, M.E., Prasad, C.V.S. and Majumdar, A.: *People's Perception about Family Planning in India*, Concept Publishing Company, New Delhi, 1980.
4. Omran, A.R. and Standly, C.S. (eds.): *Family Formation Patterns and Health, An International Collaborative Study in India, Iran, Lebanon, Philippine, and Turkey*, WHO, Geneva, 1976.

FREQUENCY OF COITUS IN WOMEN ATTENDING FAMILY WELFARE CLINICS

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INTRODUCTION

Sexual behaviour is an important determinant of fertility. The acceptance of condoms and conventional contraceptives is poor - less than 5 per cent - among eligible couples in India[1]. This may be related to the frequency of coitus and living conditions of the couples, the majority of whom belong to the lower socio-economic classes. Couples with a high or very low frequency of coitus may feel shy to disclose the actual frequency to the health personnel and this may cause shortage or wastage of contraceptive supplies in individual cases, the former leading to unwanted pregnancies. Moreover, couples with higher coital frequency but with poor living conditions may have practical difficulties in the use and disposal of coitus-related methods. Since there is paucity of factual data on this aspect[2,3] we interviewed women attending family welfare clinics regarding frequency of coitus, coitus during pregnancy and some related socio-economic factors. They were also asked about their experience with condoms. Women from urban as well as rural clinics participated in this study.

SAMPLE AND METHODOLOGY

A total of 1045 women who attended the welfare clinics of the Institute for Research in Reproduction, Bombay, were interviewed by trained social workers who had a good rapport with them. They were asked about the average monthly frequency of coitus during the last six months (or six months prior to conception in case of pregnant or puerperal women). History of coitus during pregnancy, and resumption of coitus after delivery was also recorded. The women were also asked whether they would like their husbands to use condoms as a spacing method if better quality (lubricated) condoms were offered to them instead of the current, non-lubricated type supplied by the programme.

The frequency of coitus was correlated with age, education and occupation of both partners, duration of marriage, number of rooms and persons

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per family, and resumption of coitus after delivery. The respondents were assured that the information given by them would remain confidential.

RESULTS

About three-fifths (59.9 per cent) of the total respondents were urban-based and the remaining were rural. The majority of the respondents (63.3 per cent) reported a coital frequency of 1 to 10 per month, though about 16.2 per cent reported sexual intercourse every day or on alternate days. Twice as many (11.4 per cent) respondents attending rural clinics reported high coital frequency (21-26 times a month) as compared to their urban counterparts (Table 1).

TABLE 1

Percent distribution of respondents by coital frequency and its relation to duration of marriage coital frequency (Number of contacts/month)

	Coital frequency			
	1-10	11-20	20-26	Total
Residence				
Urban	67.4	27.6	5.0	100.0
Rural	65.7	22.8	11.4	100.0
Duration of marriage (years)				
1-5 years	64.5	24.3	11.2	100.0
6-10 years	68.4	27.8	3.8	100.0
11-15 years	69.0	26.2	4.8	100.0
16-20 years	70.9	26.6	2.5	100.0

The average weekly frequency worked out to 2.7 per week for rural women, 2.2 per week for urban women and 2.4 per week for the sample as a whole.

Table 1 also gives the frequency of coitus in relation to duration since marriage. Couples who had been married for five years or less reported a higher frequency as compared to those with a longer marriage duration.

Table 2 analyses the responses given by the wives by age, education, and occupation of both the wives themselves and their husbands. The frequency of coitus appeared to be high among men and women below the age of 25 and decreased with age, more so among men. It was highest in men and women below 25 years of age. When education was considered, the percentage of women with higher education who reported frequent coitus (21-26 per month) was 29.2 to 31.5 per cent whereas among their husbands, it was higher - 45.9 to 55.9 per cent (Table 2). More educated wives than husbands (as reported by their wives) also reported frequencies of 1-10 and 11-20. Women who were housewives, clerks or labourers reported a higher frequency of sexual intercourse as compared to those with other occupations, while among their husbands, labourers, factory workers and farmers were found to have higher

TABLE 2

Percent distribution of couples by coital frequency in relation to age, education and occupation of the respondents and their husbands

	Coital frequency (Number of contacts/month)					
	Wife			Husband		
	1-10	11-20	21-26	1-10	11-20	21-26
Age (years)						
16-25	65.9	23.9	10.2	63.0	23.4	13.6
26-35	67.7	28.0	4.3	66.9	26.1	7.0
36-45+	69.4	29.2	1.4	69.7	26.7	3.6
Education						
Illiterate	30.5	50.8	18.7	14.6	52.7	32.7
Literate	—	37.5	62.5	—	42.9	57.1
Primary	11.0	50.0	39.0	5.5	31.5	63.0
Middle school	20.4	21.4	35.0	15.1	34.9	50.0
SSCE	22.6	45.9	31.5	11.9	42.2	45.9
College	18.4	52.4	29.2	8.1	36.0	55.9
Occupation						
Unemployed/ Housewife	64.1	28.4	7.5	50.0	50.0	—
Teacher	76.9	23.1	—	71.0	29.0	—
Factory worker	80.0	20.0	—	65.5	23.7	10.8
Labourer	66.7	22.2	11.1	61.3	29.9	9.0
Clerk	53.3	40.0	6.7	69.9	26.1	4.0
Farmer	—	—	—	64.2	22.6	13.2
Professional	76.2	19.0	4.8	60.6	33.8	5.6
Business	100.0	—	—	48.7	46.1	5.2

coital frequency as compared to others (Table 2).

The type of family, joint or nuclear, did not appear to affect the frequency of coitus (Table 3). The number of rooms or persons per family did not influence it directly but the frequency was highest when family size was two and lowest when only one room was available.

TABLE 3

Percent distribution of respondents by coital frequency in relation to type of family

Type of family	Coital frequency (Number of contacts)			
	1-10	11-20	21-26	Total
Joint	66.2	25.7	8.1	100.0
Nuclear	67.2	25.8	7.0	100.0

A majority (85.8 per cent) of the respondents reported to have had intercourse during pregnancy - 38.5 per cent reported coitus in third trimester, and 2.9 per cent reported a frequency of 21-26 per month. About 86.6 per cent of urban and 79.2 per cent of rural women had resumed coitus by six

months postpartum (Table 4).

The findings with respect to the respondents' awareness of, experience with and possible future use of condoms is summarised in Table 5.

TABLE 4

Percent distribution of urban/rural respondents by resumption of coital activity postpartum

Number of months after delivery	Coital frequency (Number of contacts/month) 1-3	4-6	7-9	10-12	>12	Total
Urban	50.5	36.1	5.9	5.6	1.9	100.0
Rural	45.0	34.2	7.1	10.4	3.3	100.0

The knowledge about condoms was observed to be very poor among rural women -- 40.1 per cent had heard, 31.7 per cent had seen, and only 6.9 per cent of rural husbands had used condoms. When asked about future use, only 23.7 per cent of all women said that they were willing to use condoms as a method if better quality condoms are provided. Of these, only 15 (1.4 per cent) reported a coital frequency of 21 to 26 per month.

TABLE 5

Percent distribution of respondents by their awareness and use of condoms

	Yes	No	Can't say
Seen condoms	53.1	46.9	
Heard about condoms	61.4	38.6	
Have used condoms	18.9	81.1	
Regular use (out of users)	46.7	53.3	
Accidental pregnancy (out of users)	23.6	76.4	
Will use condoms in future	23.7	68.2	

The duration of lactational amenorrhoea was less than six months in 47.7 per cent of the respondents and more than six months in the remaining. In 70.9 per cent of the respondents, top feeds for the baby were started within six months.

DISCUSSION

Frequency of coitus may determine the acceptance of coitus-related contraceptives. This study indicates that almost 16.2 per cent of the respondent women or one out of six, reported to be having intercourse on alternate days or daily. Factors such as increasing age of husband or wife, and duration of marriage were associated with a low frequency of coitus to a certain extent. Husband's education did not correlate with coital frequency as reported by the wives but a lower proportion of women with college education reported a frequency of 21-26 per month. Another important finding was that urban and rural data had many similarities including frequency, pattern and resump-

tion of coitus after delivery.

The type of family, surprisingly did not affect the frequency of coitus. Given the poor housing conditions of lighting, water supply and toilet facilities in this low socioeconomic group, it is possible that coitus-related methods, like condoms, diaphragm, vaginal tablets or jellies and creams which need privacy for application and facilities for disposal, may not be popular as long term contraceptive methods.

A similar study was carried out by Kapoor and Aravindakshan[2] ten years ago. The study was retrospective and samples were spread over a eight-year period. The findings were similar but a higher proportion of couples reported a frequency of 16-26 per month in the present study. The average frequency in this study in urban women was 2.2 per week similar to that reported in 1980. The average weekly frequency in rural women was more than that in urban women in the present study. That an increase in education does not play a major role in frequency of sexual intercourse has been postulated by Yadav and Rai in 1989[3]. However, only 8.7 per cent of the urban respondents reported a frequency of 15-26 per month against 16.2 per cent of the rural respondents in the present study. More educated wives (middle school or higher) were likely to report a low or moderate coital frequency, whereas, their husbands, with higher education tended to fall into the high coital frequency group (based on the wives' responses).

Another observation is that of coital frequency during pregnancy which was frequently reported in this socio-economic group, even in the last trimester of pregnancy in several cases. This may have an important bearing on the initiation of premature labour and transfer of sexually transmitted diseases to the pregnant mother as well as the neonate[4].

Previously we have demonstrated the presence of ovulatory levels of progesterone in lactating women[5]. In a recent study, Diaz and coworkers[6] observed that in Chile 26% of women ovulated at six months postpartum. When the first menstrual period occurred before six months it predicted risk of pregnancy even in fully nursing women. In a previous study, Peters et al[7] observed that 33 per cent of women had menstruated by eight months postpartum. These women belonged to the same area and socio-economic group as in the present study. However, we observed that 47.7 per cent of the respondents menstruated before six months. Thus it appears that the average duration of lactational amenorrhoea has reduced over the last 30 years probably as a result of urbanisation and overcrowding along with the women's employment.

Resumption of coitus was early, i.e. before six months postpartum. In more than 79 per cent of cases in urban as well as rural cases. When combined with the information on short lactational amenorrhoea and early institution of top feeds the need for effective contraceptives, before six months postpartum cannot be overemphasised.

ACKNOWLEDGEMENTS

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REFERENCES

1. Family Welfare Programme in India : Year Book (1987488) Govt. of India, Ministry of Health & Family Welfare, New Delhi, 1989.
2. Kapoor, I. and Arvindakshan T.K.: "Coital frequency of urban couples attending a family planning clinic at Bombay", *The Journal of Family Welfare*, 26(4): 50-63 (1980).
3. Yadava, R.C. and Rai, M.K. : "Some results on frequency of sexual intercourse among urban couples", *The Journal of Family Welfare*, 35(6): 58-62 (1989).
4. Martius J., Krohn, M.A., Hillier S.L., Stamm W.E., Holmes K.K. and Eschenback, D.A.: "Relationship of vaginal lactobaccillus species, cervical chlamydia trachomatis and bacterial vaginosis to preterm birth", *Obstetrics and Gynaecology*, 71: 89-95 (1988).
5. Joshi, U.M., Joseph, R., Adatia, A., Choudhary, V., Joshi, J.V., Mehta, S. and Hazari, K.T.: "Serum progesterone in women with lactational amenorrhoea," *Ind. Journal of Medical Research*, 72: 508-511 (1980).
6. Diaz, S., Rodriguez, G., Peralta, G., Miranda, P.,Casado, M., Salvatierra, A., Herreros, C., Brandeis A., and Croxatto H.: "Lactational amenorrhoea and the recovery of ovulation and fertility in Chilean women," *Contraception*, 38: 53-67 (1988).
7. Peters, H., Israel, S. and Purushottam, S.: "Indian women: Duration of amenorrhoea and vaginal and cervical cytology", *Fert. Steril.*, 9: 134-144 (1958).

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Contents

Page

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CONTENTS

CONTRACEPTIVE USE AND ITS FERTILITY IMPACT IN BANGLADESH

DR. M. MAZHARUL ISLAM

INTRODUCTION

Among the South Asian countries, Bangladesh is the most densely populated—about 630 persons per sq. km. It also has a very high fertility rate. Studies conducted in the early sixties reported Bangladesh's total fertility rate as seven[1]. Several recent studies[3 5] have reported that fertility is declining in Bangladesh at a very slow rate, and at present, it is around five births per woman which is still very high. The population which was nearly 42 million according to the 1951 Census, has more than doubled to 89.9 million by 1981, and even if the present rate of fertility declines to replacement level by the turn of the century, the total population of Bangladesh will be about 128 million then.

Being fully aware of the social and economic costs and consequences of such a high growth of population, the Government of Bangladesh has declared population as a top priority problem and has been strengthening the national family planning programme since its independence in 1971, through increased allocation of resources for family planning. expanded use of multi-sectoral approaches, use of mass media campaigns, and promotion of increased participation of voluntary and private agencies in population programmes. In addition, the family planning programme has been expanded to include field workers who are trained to provide family planning services and information on modern contraceptive methods. The programme is also careful about the supply of these methods at the doorstep of the people. Unfortunately, very few studies have been conducted to evaluate such programme activities which require in-depth analyses of published data from various contraceptive prevalence surveys and fertility surveys.

OBJECTIVES

With this in mind, this paper makes an attempt to examine contraceptive prevalence levels and trends, and their fertility impact. The interest lies in the fact that an understanding of the nature of contraceptive use in a high fertility country like Bangladesh, will also lead to an understanding of the onset of fertility decline. Further, a precise understanding will enable us to formulate a sound population policy and develop suitable methodologies for

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systematic fertility analyses.

DATA

The main source of data used for studying contraceptive prevalence levels was the fourth and the most recent nationwide Contraceptive Prevalence Survey, 1985[4] widely known as CPS '85, sponsored by the Government of Bangladesh and funded by the USAID Dhaka Office. However, in order to analyse trends in contraceptive use and their fertility impact, data from several important, previous national level contraceptive prevalence and fertility surveys were also utilised—the 1969 National Impact Survey, the 1975 Bangladesh Fertility Survey, and the 1979, 1981 and 1983 CPS. All these surveys which are nationally representative and contain detailed questions on socioeconomic background and family planning knowledge, attitude and practice, have been published elsewhere in detail[3-6].

RESULTS AND DISCUSSION

Knowledge of contraceptive methods

In the CPS, data on knowledge of contraceptive methods were collected through a series of questions applying spontaneous recall and promoting procedures[7], that is, the interviewer briefly described a variety of methods as some respondents are not able to recall all the methods that they know during the interviewing situation. As a result, it is likely that knowledge is, to some extent, overstated. Table 1 gives a distribution of ever married women under 50 years of age by their knowledge of individual contraceptive methods, at the national level, and at the sub-national level on the basis of the place of residence and education.

Almost every ever-married woman was generally aware of the oral pill (98.6 per cent) and tubectomy (97.8 per cent). The next best-known methods were vasectomy followed by the condom, injectable, and the IUD in that order (84.3, 75.5, 74.1 and 65.4 per cent, respectively), at the national level. Knowledge about traditional methods was lower than that regarding modern methods at both national and sub-national levels. Among the traditional methods, knowledge about the 'safe period' was the highest (41.2 per cent).

Table 1 also shows that the place of residence and educational level exert a strong influence on contraceptive knowledge. Urban couples had consistently higher knowledge about the different methods than did their rural counterparts, except in the case of the oral pill and tubectomy. Educational levels were positively associated with knowledge of contraception - hundred per cent of the women who held a degree (post-school) and above, knew all the modern methods of contraception.

It may be mentioned here that in the CPS, knowledge refers to whether

Percent distribution of ever-married women under 50 having knowledge of selected family planning methods by place of residence and education levels, CPS 1985

Method	Total	Place of residence		Level of education						
		Rural	Urban	No schooling	Less than primary	Completed primary	Class VI-VII	Class VIII-	SSC/HSC	Degree and above
Modern methods										
Oral pill	98.6	98.5	99.2	98.1	99.0	99.9	100.0	100.0	100.0	100.0
Condom	75.5	74.0	89.3	69.2	83.8	92.9	95.8	98.8	98.7	100.0
Spermicide	26.3	23.5	51.9	16.5	33.5	48.5	64.9	76.6	90.6	100.0
Injection	74.1	72.7	86.4	68.9	81.7	85.6	90.6	95.1	96.9	96.9
IUD	65.4	63.7	80.8	57.9	75.8	83.2	89.4	93.9	95.6	100.0
Tubectomy	97.8	97.7	98.5	97 3	98.4	99.0	99.6	100.0	100.0	100.0
Vasectomy	84.3	84.0	86.8	81.4	88.3	90.3	92.8	94.7	97.5	100.0
Induced abortion	57.3	55.4	74.7	51.1	65.1	72.2	72.0	82.8	95.0	100.0
Traditional methods										
Safe period	41.2	40.0	51.0	34.9	46.9	57.6	63.0	65.6	80.5	87.5
Withdrawal	20.8	19.4	33.2	14.3	26.0	32.6	42.3	52.0	76.1	83.3
Abstinence	21.4	20.2	32.3	17.3	25.0	28.6	33.6	43.0	56.0	79.2
Other	36.8	36.8	36.7	34.6	41.0	43.5	37.0	43.0	46.5	29.2

a respondent knows of or has heard of the family planning method. Hence, reported knowledge of a CPS respondent about a method should not be taken as an indication that the respondent understands the contraceptive effect of the method or its use.

Level of current use of contraception

Table 2 summarises the current level of contraceptive use in Bangladesh. Approximately 25.3 per cent of currently married women were currently practicing a method of family planning; of these, 18.4 per cent used modern methods and 6.9 per cent, traditional methods. About fifty per cent of the total use of modern methods was contributed by modern permanent methods.

TABLE 2

Percent distribution of currently married women under 50 by method specific, current use of contraception, CPS 1985

Method	No. of women	Percentage
Modern methods (total)	1439	18.4
Oral pill	399	5.1
Condom	139	1.8
Spermicide	15	0.2
Injection	37	0.5
IUD	113	1.4
Tubectomy	615	7.9
Vasectomy	121	1.5
Traditional methods (total)	540	6.9
Safe period	298	3.8
Withdrawal	71	0.9
Abstinence	41	0.5
Other	130	1.7
Any method	1979	25.3

Among individual methods, female sterilisation (tubectomy) claimed the highest prevalence rate (7.9 per cent), followed by the oral pill (5.1 per cent), safe period (3.8 per cent), condom (1.8 per cent), and vasectomy (1.5 per cent). The injectable, abstinence, and spermicides were the least used methods.

Interestingly, traditional methods constituted a substantial portion of the contraceptive prevalence rate in Bangladesh, accounting for 27.3 per cent of all current users in the sample. Such findings have also been observed in many developing countries such as Malaysia[8-10]. The sizeable contribution of traditional methods to overall contraceptive prevalence deserves special attention by the family planning programme.

Socioeconomic differentials in current use of contraception

Table 3 gives the current use of contraceptive methods by broad category, that is, modern permanent, modern temporary and traditional, under different socioeconomic conditions. The socioeconomic factors considered here are place of residence, religion, educational level and employment status.

There is large variation in the current use of contraception between rural and urban areas. The proportion of currently married women in rural areas using a family planning method is only 23.1 per cent, compared to 44.2 per cent for urban areas. This rural-urban disparity is mostly due to the use rate of modern methods, ranging from 16.4 per cent in rural areas to 36.8 per cent in urban areas. There is small variation in the rate of modern permanent and traditional methods between the two areas.

TABLE 3

Percent distribution of currently married women under 50 currently using contraception by broad category of method and socioeconomic background, 1985

Socioeconomic background	% of users by category of method			% of total users
	Modern method		Traditional methods	
	Permanent	Temporary		
Place of residence				
Rural	9.3	7.1	6.8	23.2
Urban	9.8	27.0	7.4	44.2
Religion				
Muslim	8.4	9.1	6.5	24.0
Non-Muslim	17.9	8.5	10.5	36.9
Education				
No schooling	10.9	5.2	5.8	21.9
Less than primary	7.5	10.4	8.4	26.3
Completed primary	5 4	17.4	9.9	32.6
Less than VI-VII	5.2	20.6	7.1	32.9
Less than VIII-IX	3.9	29.3	12.2	45.4
SSC and HSC	2.6	40.4	12.6	55.6
Degree and above	4.2	50.0	16.7	70.8
Employment				
Paid employment	22.2	9.3	10.1	41.5
Unpaid employment	14.5	13.0	5.8	33.3
Not employed	8.7	8.9	6.7	24.4

Differentials in current use of contraception by religion shows a large disparity between Muslim and non-Muslim women. Among Muslim women, only 24 per cent reported using a family planning method; this rose to 37

per cent for non-Muslim women. The disparity between the two groups was mainly due to higher use levels for modern permanent and traditional methods among non-Muslim couples.

Education shows a strong influence on contraceptive use. The proportion of women using contraception consistently increased by level of education. The current use rate of contraception was only 22 per cent among couples who had never attended school; it increased to 33 per cent for those having completed primary school, and reached a high of 70.8 per cent for those who had received education up to the degree level and above. Current use rates for modern temporary methods and traditional methods followed similar trends as for overall use rate, though deviations were evident in the case of modern permanent methods with current use being inversely related to education. The proportion of currently married women relying on modern permanent methods was highest (10.9 per cent) among those who had not received any formal education. Current use of permanent modern methods declined among women who had attained higher levels of education, reaching 2.6 per cent among those who had attained secondary education.

Significant variations in contraceptive prevalence were observed when employment status was considered, with women having paid employment showing the highest rate of current use. An intermediate use rate was observed among those having unpaid employment, and the lowest rate among those who were unemployed. Modern permanent methods were used primarily by women who held paid employment. It can, therefore, be suggested that contraceptive use rate can be increased by providing women with employment opportunities outside the home.

Trends in current use of contraception

The data presented in Table 4 shows that the contraceptive prevalence rate has been steadily increasing in Bangladesh.

Between 1975 and 1985, current use of contraception increased from 7.7 per cent to 25.3 per cent. In other words, during the last decade, contraceptive use rate increased by 18 per cent. However, as the average annual increase in the contraceptive prevalence rate has been estimated at 1.8 per cent, it can be said that if this rate of annual increase remains constant, the current use rate will increase substantially and will exceed 50 per cent by the end of 2000 A.D.

The results presented in Table 5 suggest a decline in the proportion of current users of the oral pill, condom and male sterilisation. Further, the decline is accompanied by a greater use of permanent methods. The decline in oral pill and condom use is likely to be due to the availability of alternative methods and the government's special efforts to promote female sterilisation. The decline in oral pill use may also partly be attributed to the side effects and irregular

TABLE 4

Contraceptive prevalence rates reported in different studies

Source	Year	Percentage of couples using contraceptives	Average annual change from 1975
NIS	1969	3.9	—
BFS/WFS	1975	7.7	—
CPS	1979	12.7	1.25
CPS	1981	18.6	1.82
CPS	1983	21.7	1.75
CPS	1985	25.3	1.76

Source: See Reference Nos. 3 to 6.

supplies. The considerable increase in the proportions using female sterilisation suggest that the major programme initiatives stressing sterilisation are having an impact.

TABLE 5

Percentage distribution of currently married women under 50 years of age practicing contraception by specific method used, from different studies

Method	BFS 1975	CPS 1979	CPS 1981	CPS 1983	CPS 1985
Oral pill	35.0	30.0	19.0	17.0	20.0
Condom	9.0	12.0	9.0	8.0	7.0
Vaginal method	—	1.0	2.0	2.0	1.0
Injection	—	2.0	2.0	1.0	2.0
IUD	6.5	2.0	2.0	5.0	6.0
Tubectomy	8.0	20.0	21.0	32.0	31.0
Vasectomy	6.5	7.0	4.0	6.0	6.0
Traditional	35.0	26.0	41.0	27.0	27.0
Total	100.0	100.0	100.0	100.0	100.0

Fertility impact of contraception

Contraceptive prevalence is strongly related to the level of fertility. Obviously, the association between them is negative. The results given in Table 6 show that the total fertility rate (TFR) decreases with an increase in the contraceptive prevalence rate. The association between TFR and contraceptive prevalence rate can be summarised by the simple regression equation.

$$TFR = 6.79 - 0.08\ (CPR),\ R^2 = 0.78,$$

where CPR stands for contraceptive prevalence rate. This indicates that the level of current contraceptive use accounts for 78 per cent of the variance in the TFR and on average, the TFR decreases by 0.08 child per woman for every one percentage point rise in contraceptive prevalence. It also indicates that in the absence of contraception, potential fertility is about seven per woman.

TABLE 6

Contraceptive prevalence rate, TFR and the proportion of reduction in fertility in different surveys

Source	Year	TFR	Contraceptive Prevalence Rate (CPR)	C_c	$(1-C_c)x100$
NIS	1969	6.0	3.9	—	—
BFS/WFS	1975	6.4	7.7	0.931	6.9
CPS	1979	6.3	12.7	0.886	11.4
CPS	1981	5.0	18.6	0.834	16.6
CPS	1983	4.9	21.7	0.821	17.9
CPS	1985	4.6	25.3	0.762	23.8

It should be mentioned here that as the regression coefficient is based on small sample observations, the large variation in the observations from one year to another may have an impact on the regression coefficient. Despite this limitation, the estimates appear to be reasonable and provide an indication of the relationship between contraceptive prevalence rate and fertility rate.

The fertility inhibiting effect of contraception can be estimated by applying Bongaarts' proximate determinant model[11]. Bongaarts defined C_c as the index of contraception which measures the extent to which fertility is reduced by contraception.

The index C_c is estimated as

$$C_c = 1 - 1.08 \times u \times e$$

where u is the proportion using contraception, e is the average use effectiveness and 1.08 is a sterility correction factor. The average use-effectiveness, e, is estimated as the weighted average of the method specific use-effectiveness as suggested by Bongaarts and Potter[12]. The estimated values of C_c for different years are presented in Table 6 and the last column of Table 6 gives the percentage reduction in fertility corresponding to the different contraceptive prevalence rates. For example, in 1975, for a contraceptive prevalence rate of 7.7 per cent, the value of C_c was 0.931 which indicates that fertility was reduced due to contraception in 1975 by 6.9 per cent. The value of C_c in 1985

was 0.762 i.e. in 1985 contraception reduced fertility by 23.8 per cent.

Contraceptive prevalence required to achieve the projected fertility declines

According to the United Nations medium variant population projection, the TFR for the South Asia and Oceania region is approximately 4.3 births per woman for the year 1990, 3.6 births for the year 2000, 2.8 births for the year 2010 and 2.1 births for the year 2025[13]. Accepting this projected level of fertility, and using the mathematical model developed by Bongaarts[14], the required level of contraceptive prevalence rate to achieve this level of fertility was estimated. The model is given by

$$U_t = \frac{1}{1.08 \times e_t} \quad 1 - \frac{TFR_t}{TFR_0} \quad C_c\,(0)$$

where U_t is the contraceptive prevalence at time t,
e_t is the average use-effectiveness at time t,
TFR_t and TFR_0 is the total fertility rate at time t and base year respectively
$C_c(0)$ is the index of contraception at base year

The projected level of fertility is not only dependent upon changes in the contraceptive prevalence rate, but also on other fertility determinants. However, Bongaarts derived the above model on the basis of some simplifying assumptions which are not unrealistic. The details of the derivation of the model are given elsewhere[14].

Taking 1985 as the base year and assuming that use-effectiveness e_t = 0.88 will remain constant, the projected level of contraceptive prevalence required to achieve the targeted level of fertility is presented in Table 7.

TABLE 7

Projected fertility rates and corresponding contraceptive prevalence rates required to be achieved in different years

	1990	2000	2010	2025
Projected TFR	4.3	3.6	2.8	2.1
Required CPR (%)	30.27	42.47	56.42	68.62

Table 7 shows that by 2025, about 69 per cent of the couples of reproductive age should be practicing contraception in order to attain a fertility rate of 2.1 births per woman.

SUMMARY AND CONCLUSION

Although there is universality of knowledge about contraceptive methods, the current rate of use of contraceptives in Bangladesh is still very low.

However, it is steadily increasing, much of this increase being the result of an increase in the use of modern methods. Among modern methods, female sterilisation, the oral pill and the condom are the most widely used methods. A marked increase in male sterilisation and IUD use is also evident. The fact that a large number of couples have adopted permanent methods indicates programme efforts directed to sterilisation or that many couples have decided to terminate fertility. In Bangladesh, women with low education proportionately resort more to sterilisation than women with higher education. For example, according to the CPS 1985, about 11 per cent of women with no education were sterilised as against four per cent who had attained secondary or higher education. One reason for this is that poor and uneducated women experience greater difficulties in obtaining supplies and lack proper knowledge of use of non-clinical modern methods. Another important reason for greater use of sterilisation is the monetary payment given to the clients.

In Bangladesh, traditional methods make up a substantial portion of the total contraceptive use rate. Inspite of programmatic efforts and the wide publicity given to modern contraceptive methods, traditional methods still cannot be replaced completely by modern methods. In the socioeconomic context of Bangladesh it seems that traditional methods can never be replaced by modern methods. Considering this, traditional methods should not be neglected in Bangladesh. Rather, they should be given proper attention so that the user can employ them more effectively. There is evidence that if correctly taught, correctly understood and consistently practiced, traditional methods can be effective[15-17].

The large disparity between urban-rural contraceptive use suggests the need for more careful attention to be paid by the family planning programme to rural areas.

Education and employment status is positively associated with contraceptive use. This is supported by the study of Chowdhury[18]. Education not only increases the awareness of social mobility, and creates a new outlook and rationalism among couples, but also reduces desired family size by raising the desired living standard, bringing about a better understanding of the reproductive process, better knowledge about health care and access to modern and effective means of birth control. Data shows that contraceptive use is higher among couples who have attained secondary or higher education than among those who have no formal education. Promoting measures to increase the educational level of couples would increase the use of contraception and thus reduce fertility. To get the desired result from the Government's fertility control programme in Bangladesh therefore, much stress should be given to raise the level of education in Bangladesh. However, the task is very difficult for a country like Bangladesh where the majority of people are illiterate. According to the 1981 census the overall literacy rate was 29.2 per cent—

male literacy rate: 39.7 per cent and female literacy rate: 18.8 per cent. The journey then is very long and so we must start immediately.

REFERENCES

1. Afzal, M.: "*The fertility of east Pakistani married women*" in W.C. Robinson ed. *Studies in the Demography of Pakistan*, Pakistan Institute of Development Economics, Karachi, 1967.
2. Alauddin, M. and Faruqee, R.: "Population and family planning in Bangladesh: A survey of the research," *World Bank Staff Working Papers*, No. 557. 1983.
3. Bongaarts, J.: "A framework for the analysis of the proximate determinants of fertility", *Population and Development Review*, 4(1):105-132 (1978).
4. Bongaarts, J. and Potter, R.G.: "Fertility, Biology and Behaviour: An Analysis of the Proximate Determinants of Fertility", Academic Press, New York, 1983.
5. Bongaarts, J.: "A simple method for estimating the contraceptive prevalence required to reach a fertility target", *Studies in Family Planning*, 15(4): 184-190, 1984.
6. Bangladesh Fertility Survey: *Bangladesh Fertility Survey, 1975: First Country Report*, Ministry of Health and Population Control, Dhaka, 1979.
7. Chander, R. and Palan, V.T.: *Malaysian Fertility and Family Survey - 1974, First Country Report*, Department of Statistics, Kuala Lumpur, Malaysia, 1977.
8. Chaudhury, R.H.: 1984. "The influence of female education, labour force participation, and age at marriage on fertility behaviour in Bangladesh," *Social Biology*, 31(1-2). 59-74 (1984).
9. Fisek, N.H.: "An Integrated health/family planning programme in Estimesgut District, Turkey," *Studies in Family Planning*, 5(7): 157-163 (1974).
10. Heer, D.M.: *Society and Population*, Prentice Hall Inc., Englewood Cliffs, New Jersey, 1968.
11. Mitra, S.N. and Kamal, G.M.: *Bangladesh Contraceptive Prevalence Survey, 1983*, Mitra and Associates, Dhaka, 1985.
12. Mitra, S.N. and Kamal, G.M.: *Bangladesh Contraceptive Prevalence Survey, 1985*, Mitra and Associates, Dhaka, 1987.
13. Morris, L. Anderson, J.E., Monteith, R.S., Kriskovich, R., Schoemaker, J. and Frutos, O. : "Contraceptive prevalence in Paraguay," *Studies in Family Planning*, 9 (10-11): 272-279 (1978).
14. National Institute for Population Research and Training: *Bangladesh Contraceptive Prevalence Survey Report 1979*, Ministry of Health and Population Control, Dhaka, 1981.
15. Tietze, C.: "History of contraceptive methods". In Charles B. Nam (ed.) *Population and Society*, Houghton Mifflin Company, Boston, 1968.
16. Tietze, C. and Potter, R.G.: "Statistical evaluation of the rhythm method", *American Journal of Obstetrics and Gynecology*, 84:692-698 (1961).
17. United Nations: "Levels and trends in contraceptive use", *Population Studies*, No. 110, ST/ESA/SER.A/110, 1989.
18. Westinghouse Health System: "Contraceptive Prevalence Survey, Model Questionnaire," Columbia, Maryland, 1982.

JOB SATISFACTION AMONG HEALTH AND FAMILY WELFARE PERSONNEL: A CASE STUDY OF TWO PRIMARY HEALTH CENTRES IN KERALA

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INTRODUCTION

The Government of India is committed to the goal of "Health for All" by the year 2000. Although efforts for developing uniform health facilities in the country had started much before the Alma-Ata Declaration, they have been intensified in recent decades. However, despite all efforts on the part of the government, family planning acceptance and utilisation of health and MCH services have remained low, particularly in rural areas.

The Primary Health Centres (PHCs) which are the focal points for the delivery of health and family welfare services in rural areas seem to have failed in executing these programmes effectively and uniformly all over the country[1]. While admittedly there is a low demand for such services in rural areas, it has been observed that the personnel involved in creating the demand have not been successful in doing so[2-4]. Among the reasons put forward to explain this are poor and inadequate service-related facilities, and poor job involvement of workers. It has been observed that even in good performing districts, there could be PHCs which show poor performance. It is in this connection that the perceptions and opinions of officials and workers responsible for programme implementation in regard to the various aspects of their job and their involvement becomes important.

OBJECTIVES

This study was therefore designed to analyse the perceptions and opinions of the health and family welfare personnel of two PHCs which differed in terms of family welfare performance, in relation to the programme and various job-related issues, as well as to study the level of job satisfaction among them. and the factors which affect it.

METHODOLOGY

The study used in-depth interviews and observations in two selected Primary Health Centres (PHCs) in a district in Kerala, selected for its sterilisa-

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tion and IUD performance which was higher than the state average; the district also ranked third among the top-performing districts in the state in 1988 (Government of India, 1988). The two PHCs were selected in consultation with the district level health and family welfare officials from two groups of good and poor performing PHCs—the performance of one of them, called as PHC I was higher than the average performance of the district, while the other called PHC II, had a performance which was less than the average district performance. Care was taken to ensure that the selected PHCs did not differ significantly with respect to the inputs provided to them from the district headquarters. Selection of the PHCs from the same district ensured homogeneity of socio-economic conditions and topographical features as far as possible. This was further confirmed from district level officials as well as secondary sources of information such as the District Gazettier.

The two PHCs had a total of 104 personnel including doctors, in position. Of these, 88 personnel could be interviewed; the rest were either on leave or had been sent on training assignments. Information sought from the available 88 respondents involved their background characteristics, perceptions regarding job-related factors and job satisfaction, and problems and suggestions for improving the existing situation. The job satisfaction scale developed by Paliwal and Sawhney[1] was utilised. The scale has a relatively high degree of internal consistency (0.78) - reliability as determined by the split-half and odd-even methods was found to be 0.82 and 0.74 respectively which is fairly high. The scale has been found to be valid for the purpose and has been recommended for such use.

RESULTS

Characteristics of the PHCs and Respondents

Information with regard to population coverage, year of establishment, distance from the nearest town, staff pattern, and inputs and facilities of the two PHCs has been presented in Table 1.

It is evident from Table 1 that PHC I catered to a larger population than the low performing PHC II. It also had a proportionately larger number of sub-centres to reach its population. Both the PHCs had been set up almost at the same time and were located at about the same distance from the nearest town. The staff pattern of the two PHCs was also more or less proportionate to the population to be served by them, except in the case of Medical Officers. The additional doctors sanctioned to PHC II were attached to the Government dispensary, and allotted from the family planning budget. The availability of paramedical staff and other infrastructural facilities were more or less similar in both the PHCs.

TABLE 1

Characteristics of PHCs and facilities required and provided

A. **Characteristics**

Characteristics	PHC I	PHC II
Population covered	1,92,008	89,151
Year of establishment	1962	1964
Distance from nearest town	11 km	12 km
Number of villages covered	34	21
Number of sub-centres	28	14
No. of Medical Officers		
Sanctioned	3	3+2*
In position	3	3+2
No. of paramedical staff		
Sanctioned	75	41
In position	67	37

B. **Facilities**

Facilities	PHC I		PHC II	
	No. reqd.	No. sanctd.	No. reqd.	No. sanctd.
Ambulance	1	—	1	—
Other vehicle	2	1	2	—
Refrigerator	2	2	2	2
Vaccine carrier	36	33	15	10
Weighing machine	30	2	15	10
B.P. instrument	5	2	5	2
Steriliser	30	30	15	2
Contraceptives	Adequate supplies		Adequate supplies	
General medicines	Inadequate supplies		Inadequate supplies	
Emergency medicines	Inadequate supplies		Adequate supplies	

* 2 additional doctors for the Government dispensary in the PHC area

The sample included 88 personnel, of whom 35 were male and 53 female. A higher percentage of the respondents belonged to middle or younger age groups, most were married and had an average of 2 children. All of them possessed the essential qualifications for their respective posts.

Family Welfare Performance

Table 2 gives the family welfare performance of both the PHCs and the number of eligible couples in the population covered by them. In PHC I, the number of sterilisations and IUD insertions were consistently high, whereas in PHC II they had been falling short of the target during the last three years. PHC I had been doing well in maternal and child health (MCH) activities too.

However, the two PHCs were found to be different with regard to certain related activities such as the maintenance of records, and in displaying charts and in the number of group meetings held by them. The PHCs maintained

TABLE 2

Performance figures of PHCs

	PHC I	PHC III
Number of eligible couples		
1986-87	24192	9086
1987-88	25396	9842
% of IUD target achievement		
1985-86	66.6	37.5
1986-87	100.3	51.4
1987-88	77.5	45.3
% of sterilisation target achievement		
1985-86	85.6	47.4
1986-87	106.5	43.1
1987-88	109.5	34.1
MCH activities 1987-88		
Antenatal cases	2636	1045
Home deliveries	112	48
Institutional deliveries	1388	317
Postnatal cases	166	614
Beneficiaries of nutrition programme, 1987-88		
Mothers	300	N.A.
Children	700	N.A.

16 to 17 registers on various aspects of the programme as was required of them. While the number of scheduled records maintained in the two PHCs were the same, PHC I displayed additional records and charts to help monitor the programme effectively. Apart from the common records, 'spot-maps' for malaria, cholera, polio, measles and whooping cough, a 'Who is Who' chart, and PHC daily abstract and control charts were found only in PHC I. The spot-map gives detailed information of the occurrence and status of a particular disease in a particular area. Similarly, the 'Who is Who' chart indicates an area-wise distribution of personnel giving their names, designations and number, thereby enabling a correct assessment of each worker's performance as well as identification of those lagging behind the target. The 'control chart' provides details of in-coming and out-going records from the PHC to the district headquarters and sub-centres, and provides information flow at a glance for effectively monitoring the programme. All these information mechanisms were not available in PHC II.

Additionally, PHC I was also found to organise an average of eight group meetings in a month in different areas of the centre to promote awareness about hygiene, immunisation, oral rehydration therapy, maternal and child care etc. Periodically, the personnel of PHC I also distributed information pamphlets on these subjects as well as on the facilities available at the PHC. The PHC also conducted frequent staff meetings to evaluate and chalk out

such activities. On the other hand, PHC II did not undertake any of these activities, and only held monthly staff meetings as per the schedule.

Programme and Job-related Problems and Priority Areas as Perceived by Doctors and Staff

Both medical and paramedical personnel were asked to state the problems faced by them with respect to the implementation of the family welfare programme, as well as to list the priority areas to improve programme performance. Table 3 gives the views expressed by the doctors in this regard.

The major problem areas as perceived by doctors from PHC I, the good performance PHC, were related to the aftercare of family planning acceptors. The doctors felt that the incentives given to clients were insufficient and should be raised to at least the equivalent of a month's wages. They also stressed that sterilisation acceptors and their children should be looked after properly, and given preference with respect to securing bank loans for agricultural purposes and building houses, as also for school admissions and exemption of fees for their children. Doctors from PHC II on the other hand, perceived problems of performance more in terms of infrastructure. They stated that

TABLE 3

Problems and priority areas as perceived by the officials/doctors

	PHC I	PHC II
A. **Problems** (officials)		
	Availability of trained staff and infrastructural facilities	Level of commitment of political leaders towards the programme
	Supervision and coordination	Level of involvement of local community in the programme
	Supply of contraceptives	Level of involvement of other non-governmental organisations in the programme
B. **Priority areas** (doctors)		
	Priorities should be given to those who have undergone sterilisation e.g. for getting bank loans for housing etc.	Insufficient staff
	Incentives should be raised	Inadequate funding and lack of
	After care of clients	infrastructural facilities
	Client's children should also be looked after properly	

the facilities provided to them were poor and inadequate, staff was insufficient, and stressed this as the cause of their failure in achieving targets.

As indicated in Table 3, doctors of both the PHCs also perceived the priority areas for improving programme performance differently. Doctors from the high performing PHC (PHC I) gave importance to the availability of trained personnel, supply of adequate infrastructural facilities and contraceptives, and proper and frequent supervision and guidance as the prime areas for programme improvement. They emphasised the importance of an organised effort for total improvement. According to the Medical Officer in charge of PHC I, "in the present set-up, the medical officer in charge is the sole responsible person for each and every activity of the PHC, while the other Medical Officers do not have any statutory powers. So delegation of power to others with regard to administrative matters becomes impossible and needs to be changed. Suggestions from the paramedical staff are also equally important in organising field activities at the PHC". The doctors from PHC II on the other hand, felt that the level of commitment of political leaders, the community, and non-governmental organisations towards the programme needed priority attention in order to better the performance of their PHC.

Doctors of PHC I were found to be more task and programme oriented whereas doctors of PHC II, despite their perceived inadequate facilities, talked about beyond programme measures. Doctors of PHC I consistently perceived the nature of programmatic problems and their solutions, that is, programme administration, whereas doctors of PHC II saw problems as something different from priorities. This difference in perception of a similar system by the officers of the two PHCs is perhaps related to the quality of leadership available at the PHCs.

Paramedical staff from both the PHCs perceived programme- related problems in a more or less similar manner. Most of them stated that potential acceptors did not readily accept family planning because they harboured misunderstandings about the side effects of various family planning methods and felt that they would get a disease after sterilisation. Other reasons for non-acceptance as cited by them included the inadequacy of monetary incentives, method failure (as in some cases of vasectomy and laparoscopy), low literacy and educational levels of the people, and anxiety over the probable death of their child(ren) after sterilisation. A few workers reported that they could not achieve the target because many people were not willing to get operated at the PHC as they preferred a private hospital to a PHC for undergoing an operation.

Levels and Determinants of Job satisfaction

It was found that the average job satisfaction score did not differ significantly between the personnel of the two PHCs. The mean and standard deviation

of the job satisfaction score were 50.7 and 6.95 for PHC I and 50.5 and 7.05 for PHC II respectively. Therefore, further analysis was undertaken by pooling the scores of the two PHCs.

All the respondents were classified into three groups according to the level of job satisfaction - least satisfied, moderately satisfied and highly satisfied. The distribution of respondents into these categories indicated that the majority of the respondents were either moderately (40.9 per cent) or highly satisfied (34.1 per cent) with their jobs. However, the number of those least satisfied was also found to be substantially high i.e. about 25 per cent of the total respondents.

The relationship between the background characteristics of the respondents and job satisfaction was analysed using the correlation technique. A negative relationship was found between age and job satisfaction indicating that the younger personnel were more satisfied with their jobs than their older colleagues. It is possible that people in the older age groups have spent a larger part of their career in the department of health and family welfare and therefore have formed definite opinions about different aspects of their job. It is also possible that longer work experience in the job has increased their expectations. This may not be the case with younger personnel who have yet to prove themselves in the job.

Job satisfaction was found to be negatively related to the residential status of the personnel suggesting that those living in the staff quarters were more satisfied and those not living in either the staff quarters nor in the same village of work were least satisfied with their jobs. The latter probably faced difficulties in reaching the place of work in time since transportation facilities to these villages were not adequate.

The relationship between total years of experience and job satisfaction was also found to be negative. The personnel with longer work experience were probably also in the older age groups and aware of all shortcomings of the department. Further, they may not have any promotional opportunities or prospects in the department.

Further analysis was done to find out the important determinants of job-satisfaction. All the personal background variables and individual dimensions of job satisfaction were treated as independent variables and step-wise regression analysis was employed to see the effect each of these variables had on the job satisfaction score. R^2 explained by each variable is presented in Table 4. The total variance explained was about 97 per cent by 14 variables included in this equation. Confidence in getting a promotion was observed to contribute the most in explaining the variance (58%). The perception of one's own chances of getting a promotion was therefore found to be the single most important variable which influenced job satisfaction. The availability of infrastructural facilities was the second important variable explaining 15% of the

TABLE 4

R^2 as explained by each variable

Variable	R2 explained
Confidence of getting promoted	0.5849
Working facilities	0.1489
Interest in the job	0.0656
Opportunity for advanced training	0.0508
Promotional avenues	0.0326
Job value	0.0224
Support for the mass	0.0137
Job shift	0.0124
Promotional procedures	0.0101
Years of experience in a particular PHC	0.0060
Job-security	0.0081
Salary	0.0052
Supervision and guidance	0.0045
Working relationship	0.0036

variance, indicating that the availability of proper infrastructural facilities enable the worker to perform his job functions with greater satisfaction. The popular notion that salary affects job satisfaction stood disproved in the present study, as it emerged as one of the last few factors in explaining the variance in job satisfaction. Among the various background variables, total years of experience was the only variable to have a negative effect on job satisfaction.

SUMMARY AND CONCLUSION

This paper is an attempt to analyse the perceptions and opinions of 88 family welfare personnel of a high performing and a low performing PHC in Kerala, about the family welfare programme and various job-related issues, their levels of job satisfaction, and the factors influencing it.

The two PHCs though operating under similar conditions and with more or less similar inputs and staff, differed significantly with respect to their performance in family planning and MCH. They also differed with regard to the perception of the officials and workers about various crucial issues related to their respective jobs, as also to the priorities to be emphasised for improving the programme, and the leadership qualities of the medical officer in charge.

The officials of PHC I which had a good performance were democratic in their outlook and emphasised the delegation of power to all officials to improve the functioning of the centre. This was evident by the fact that there were extra staff meetings in this PHC every month to chalk out and review the performance showing a collective decision making process. Incidentally, it may be mentioned that the medical officer in charge at this PHC had a diploma in management.

It was found that the average job satisfaction score did not differ significant-

ly between the personnel of the two PHCs. Most of the respondents were either moderately or highly satisfied with their job. However, the number of those least satisfied was also found to be substantially high (25%). The age of the respondents and length of service were negatively related to overall jobsatisfaction. Employees who had been provided with staff quarters were found to be highly satisfied with their job functions, as compared to those who were not given staff quarters and were either staying in the village of work or outside it.

Further multivariate analysis of the determinants of job satisfaction showed that one's own confidence of getting a promotion was the single most important variable which explained the variance in job satisfaction. The total years of experience emerged as the only variable among the background characteristics studied which influenced job satisfaction.

Certain questions that naturally follow these findings are: 1) are these differences in personality and perceptions of functionaries responsible for the differences in the performance of the two PHCs?; 2) why do functionaries of two PHCs differ in terms of perception of various programme related issues and problems despite having a similar background to work in ?; and 3) what is the role of individual factors vis-a-vis the organisational factors in determining performance?

To answer these questions is perhaps beyond the purview of this paper. However, it appears logical to conclude that while organisational factors are a necessary precondition for performance, they may not be sufficient for improving performance, and this is where the role of individual's involvement in the organisation becomes crucial. National level studies conducted in Malaysia[2] and Korea[2] provide conclusive evidence in that the motivation of clinic personnel through more frequent field visits and more coordinated activity of personnel were found to be major determinants of programme productivity. Leadership and decision making were also found to have importance in programme productivity. A study conducted in India also has shown that organised efforts, better training, close and frequent interaction of workers with supervisors and good pay are found to be important factors of good performance[7].

While the present paper does not analyse the relationship between job satisfaction and performance, the significance of job satisfaction of health and family welfare workers in improving performance cannot be denied. Considering this is true, the present paper highlights those factors which can enhance the satisfaction a worker derives from his or her work. Some of these factors include more openings for internal promotions, better work facilities and opportunities for advanced training. In this connection the policy of frequent transfers of these personnel needs to be revised so as to permit a person to prove himself or herself before he or she is transferred.

REFERENCES

1. Paliwal, M.B. and Sawhney, N.: "Job satisfaction measuring scale for family welfare personnel", Population Centre, Lucknow (typed report), 1982.
2. Rastogi, S.R.: "Study of family planning workers in Uttar Pradesh", Demographic Training Centre, Lucknow (typed report), 1978.
3. Reddy, P.H. and Narayana, G.: "Health and family welfare programme personnel" India Population Project, Bangalore, (typed report), 1978.
4. Satia, J.K.: "Family planning workers and problems of programme implementation", *Economic and Political Weekly, 11(38): 1547-1552 (1976).*
5. Chee, S. and Onn, F.C.: "Malaysian National Study: Organisational determinants of family planning clinic performance", *Management Studies of Family Planning Programmes in Selected Asian Countries,* UNFPA, New York, pp. 1-36, 1980.
6. Kim, K.W.: "The Republic of Korea Study: Organisational determinants of family planning clinic performance", *Management Studies of Family Planning Programmes in Selected Asian Countries,* UNFPA, New York, pp. 71-120, 1980.
7. Khan, M.E., Prasad, C.V.S. and Ghosh-Dastidar, S.K.: (eds.): *Performance of Health and Family Welfare Programme in India*, Himalaya Publishing House, New Delhi, 1988.

INCOME AND MARITAL SATISFACTION

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INTRODUCTION

Women's increasing participation in outside employment and the consequent growth in the number of families with two sources of income—the husband's and the wife's - is creating a new dimension in Indian marriages. Along with this increase, there have been significant changes in the economic and social status of women. Hence, contemporary Indian families are besieged with internal and external stresses leading to less satisfaction in marital life.

Marital satisfaction is perhaps the "most studied" variable in the field of family studies, and has been reported to be related to several socio-economic as well as demographic factors including household income[1]. Burgess and Locke[2] and Kapur[3] suggest that marital satisfaction increases with income, while others[4] provide evidence that income is not the most important factor. Berry and Williams[5] observed that agreement over financial matters was the most important predictor explaining marital satisfaction.

It was therefore considered worthwhile to explore the extent of satisfaction in family life, a subject on which literature in the Indian context is sparse. The purpose of this study then is to examine some of the objective and subjective factors known to influence the degree of satisfaction in married life.

OBJECTIVES

The study was based on the assumption that income and agreement over financial expenditure are positively related to marital satisfaction. On this basis, the following hypotheses were drawn:

1. High income of the spouses is positively correlated to high marital satisfaction, and
2. Agreement between spouses over financial expenditure is positively correlated to marital satisfaction

METHODOLOGY

The data for the present study came from 150 women working in hospitals. colleges and schools situated at Burla and Sambalpur in the state of Orissa. The study was limited to women as they are easy to locate and could afford to spare more time to provide the detailed information related to income and expenditure required for the study. The respondents were in the age group of 21 to 55 years.

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Kapur's interview schedule[3] which provides a base for Indian circumstances and is a valid measure of marital satisfaction, and Spanier's dyadic adjustment scale[6] which has a high degree of correlation were used. The interview schedule was pilot-tested with 15 working women and the necessary modifications made. The final questionnaire consisted of 25 questions. Item weighting was given to all questions ranging from 5 to 1 - 5 indicating maximum dissatisfaction. Several items were included covering the following areas of marital satisfaction: decision making, handling of finances, marital happiness, attitudes towards separation and divorce, attitudes towards working women's job and roles, sexual satisfaction, leisure time spending, and performance of dual roles.

Individual interviews took place with the respondents. Each respondent was asked to fix the date and place for interview according to her convenience. All interviews were conducted either at the respondent's home or at their place of work; and lasted an average of 3 to 4 hours, sometimes in two to three sittings.

Descriptive statistics such as average distribution, and simple and multiple regression were applied to determine the relationship between income and agreement over financial expenditure with marital satisfaction. It was not possible to emphasise many factors such as age, education, occupation etc.

RESULTS AND DISCUSSION

Table 1 presents the descriptive income levels of the husbands, the wives, the total income and income differences between the spouses. The average distribution indicated that the income of the wife, the husband, and total income bore a greater correlation to marital satisfaction. Hafstrom and Dunsing[4] have also reported that income is directly translated into buying power and acts as a source of power in marital relationships. Hence, the husband who provides more income, may exercise more power in the relationship. In addition, due to higher income, the husband can afford to have other resources which minimise the wife's participation in domestic work. Thus, satisfaction in marriage appeared to be more related to the husband's income than to the wife's. Regression analysis also supported the above finding in that the husbands' income and the total family income correlated more with marital satisfaction than the wives' income - the 't' values were 4.26, 4.51 and 2.88 for the husbands' income, the total income and the wives' income, respectively.

The income difference between the spouses did not show any clear-cut and consistent trend to suggest any relationship between it and marital satisfaction (Table 1). Even, the 't' value of 1.41 which was significant at a 10% level was indicative of a small association between the variables.

TABLE 1

Degree of satisfaction and average income of wife, husband, total income and income difference between the spouses

Satisfaction score	Average income in (Rs.) of			
	Wife	Husband	Total	Income difference between spouses
25-45	682.29	543.29	1225.58	397.29
46-65	711.00	650.00	1361.00	629.00
66-85	707.56	894.00	1607.19	347.00
86-105	739.07	944.80	1636.78	454.00
106-125	944.41	1215.00	2159.41	581.59
All	777.33	968.27	1716.60	473.54

Table 2 presents the findings of agreement over financial spending which shows that the greater the agreement over financial spending, the more the marital satisfaction. Proper planning and spending patterns of family income make a family happy. Planned expenditure adds useful material possessions which may reduce the work load of the wife and create a congenial environment at home. Regression values also point to the same conclusion, the 't' value of 4.48 being significant at a 2.5 per cent level, showing a close relationship between the two variables.

TABLE 2

Degree of satisfaction and average level of agreement over financial planning

Satisfaction	Average agreement score over financial expenditure
25-45	3.85
46-65	3.60
66-85	3.87
86-105	3.94
106-125	4.46

Marital satisfaction is a function of several or all of such criterion scores and as such it was considered worth examining their combined effect in order to be able to draw reasonably acceptable conclusions. For this purpose, multiple regression was used with marital satisfaction as the dependent deviser and other factors - total income, agreement over financial expenditure - as independent variables.

Total income as a variable did not seem to be very important for marital satisfaction, as the regression value changed from positive to negative (−0.0017). The present findings are contradictory to the studies of Burgess and Locke[2] and Goode[7] but relate to that of Hafstrom and Dunsing[4]. Further, the multiple regression between agreement over financial expenditure and marital satisfaction showed a moderate association as expressed in the

co-efficient of 1.20. The multiple as well as simple regression results indicated almost the same magnitude of association between these two variables. The above observations that agreement over family financial expenditure contributes to the quality of life indirectly through marital satisfaction are supported by those of Berry and Williams[5].

CONCLUSION

In sum, the study indicates that total income has at best no association with, and at worst a negative association with marital satisfaction. It also demonstrates that agreement between spouses over financial expenditure is reasonably associated with marital satisfaction. The study has yielded some important findings but is limited to women respondents. Hence, additional studies including both sexes are required to draw further valid conclusions.

REFERENCES

1. Spanier, G.B. and Lewis, R.A.: "Marital quality: A review of the seventies", *Journal of Marriage and the Family*, 42:825-839 (1980).
2. Burgess, E. W. and Locke, H.J.: *The Family*, American Books, New York (1953).
3. Kapur, Pramila: *Marriage and Working Women in India*", Vikas Publications, New Delhi (1970).
4. Hafstrom, J.W. and Dunsing, Marilyn M.: "Level of living: Factors influencing the homemaker's satisfaction", *Home Economics Research Journal*, 2:119-132 (1973).
5. Berry, Ruth E., and Williams, Flora L.: "Assessing the relationship between quality of life and marital and income satisfactions: A path analytic approach", *Journal of Marriage and the Family*, 49:107-116 (1987).
6. Spanier, G.B.: "Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads", *Journal of Marriage and the Family*, 38:15-29 (1976).
7. Goode, W.J.: "Marital satisfaction and instability: A cross cultural analysis of divorce rates", *International Social Science Journal*, 14:507-526 (1962).

WHAT DO MALES AND FEMALES OF DELHI CITY THINK ABOUT FEMALE FOETICIDE?

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INTRODUCTION

Women have been subjected to many forms of discrimination. Girls, though legally eligible, are inhibited from inheriting parental property. In regard to medical attention, education, during celebrations, and even in the day to day affairs of life, boys get a distinct priority over girls. The demand for dowry has further reduced women to the rank of second class citizens, but worst of all is denying them the right to birth as depicted by recent developments in society. Anjali[1] records the following incidents:

— 78,000 female foetuses were destroyed from 1972 to 1982 in the country with the help of the amniocentesis test.
— According to a study conducted by the government of Maharashtra, at least 50,000 such tests were conducted in Bombay alone in a year. If the test showed a female foetus, the next step was the termination of pregnancy.

The sex determination test is a sad example of the misuse of new scientific developments in the field of medicine - a test meant for diagnosing genetic abnormalities is now used for selective elimination of female foetuses[1,3]. But the misuse has its roots in the cultural value attached to boys.

The process of female foeticide has been considered by many sociologists as a continuation of female infanticide[4,5]. This shows that the value system has not changed. Scientific developments have only quickened the pace of elimination of the girl child from the born to unborn stage. Female infanticide is still practiced in many parts of the country especially by Rajput community in Rajasthan and Kallar community in Tamil Nadu[6].

Social reformers, women groups, economists and politicians have expressed different views regarding sex determination tests and female foeticide. Most of them have condemned it as a heinous act; they say hoardings which proclaim: "Better five thousand now than five lakhs later", and "Pay Rs.60 + Rs.60 and get a desired child" (Rs.60 for the test and Rs.60 for an abortion), allure and tempt prospective parents to try it. However, those who have opined in favour of female foeticide say that our society breeds inequality at all

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levels. So, is the sex determination test any worse than the acts already being committed and accepted by our society? Laws which do not get the support of society cannot be effective in this vast country. In fact, they argue that in order to control population, the practice of sex determination and female foeticide should be allowed; the main reason for the growing population is the intense craving of couples for a male child, and consequently, many female babies are born until the male baby appears on the scene.

Female foeticide is a social phenomenon and various social forces may compel parents to commit such an act. Therefore, factors such as sex, age, occupation, number of children, number of daughters, number of sons, ethnic group, and socioeconomic status may influence couples to have either positive or negative opinions regarding female foeticide.

OBJECTIVES

Keeping the above-mentioned facts in view, a survey was undertaken to

1. elicit the opinions of males and females of Delhi city, regarding the social and moral aspects of female foeticide;
2. study the differences in the opinions expressed by males and females with respect to sex, age, occupation, number of children, number of daughters, number of sons, ethnic group, and socioeconomic status;
3. determine the opinions of the respondents regarding the causes of and the measures to be taken to prevent female foeticide.

SAMPLE AND METHODOLOGY

A sample of 300 respondents consisting of 150 males and females each was purposively selected from a residential area of North Delhi. The respondents were further divided into groups of 50 each based on their income level as determined by the type of flat allotted to them by the Delhi Development Authority.

A questionnaire in two parts was fielded to collect the required data. The first part dealt with background information—sex, age, occupation, number of children, number of daughters, number of sons, ethnic group, religion, and caste of the respondents. The second part of the questionnaire consisted of a total of 48 positive and negative opinion statements regarding the social and moral aspects of female foeticide, causes of female foeticide, and the steps to be taken to prevent it. The opinion statements covered items regarding female foeticide and the resulting imbalance in the numbers of both sexes; the social status of the woman; ill treatment of the woman; religious, cultural and social beliefs; population control; sensitivity against crime, and social life and social problems.

Scoring of data

The scoring of positive and negative items under the social and moral aspects of female foeticide was done as shown below:

Nature of item	*Agree*	*Disagree*
Positive	2	1
Negative	1	2

The maximum and minimum scores possible for a respondent were 48 and 102 respectively. The scores were summed up and the range of scores was divided into three categories: 'highly negative' (48-67), 'somewhat negative' (68-81), and 'positive' (82-102). Respondents in the 'positive' category reflected their agreement with the social and moral aspects of female foeticide, while those in the other two categories represented disagreement with these aspects.

Scoring of statements regarding the causes and steps to prevent female foeticide was done as shown below:

Causes Degree of commonness	Score	*Steps* Degree of effectiveness	Score
Mostly	3	Most effective	3
Sometimes	2	Effective	2
Very few times or never	1	Least effective	1

The statistical measures used for data analysis were percentages and Chi squares. Percentages were calculated for the background information collected from the respondents, for determining the overall and aspect-wise opinions regarding the causes of and steps to prevent female foeticide. The Chi square test was used to calculate significant differences in the overall and aspect-wise opinions of the respondents regarding female foeticide, as also to calculate the significant differences in their opinions in relation to selected variables. The differences in the opinions expressed by the respondents were calculated in categories for all the variables. The categories were:

1. Overall respondents in relation to a variable.
2. Only male respondents in relation to a variable.
3. Only female respondents in relation to a variable.
4. Male and female respondents with the first category of variable
5. Male and female respondents with the second category of variable
6. Male and female respondents with the third category of variable.

For example, for studying the differences in opinion in relation to age,

the following categories were made:

1. Overall young, middle-aged and older respondents
2. Young, middle-aged and older male respondents
3. Young, middle-aged and older female respondents
4. Young male and young female respondents
5. Middle-aged male and middle-aged female respondents
6. Older male and older female respondents.

RESULTS

Background characteristics of respondents

Table 1 presents the background characteristics of the male and female respondents.

TABLE 1

Percentage distribution of male and female respondents by selected background characteristics

Variable	Males	Females
Age (years)		
Young (18-30)	30	39
Middle-aged (31-40)	31	33
Older (41 +)	39	28
Education		
Undergraduate	15	27
Graduate	41	51
Postgraduate	44	22
Occupation		
Males:		
Skilled worker	54	
Middle-order vocation holder	27	
Professional	19	
Females		
Employed		57
Unemployed		43
Family income		
Group I (Rs. 8000 +)	11	12
Group II (Rs. 5000-7999)	26	30
Group III (Rs. 2000-4999)	53	50
Group IV (Rs. 500-1999)	10	8
Group V (Rs.500)	—	—
Number of children		
0 or 1 Few	43	22
2 Average	27	44
3 or more More	30	34

TABLE 1 *(Contd.)*

Percentage distribution of male and female respondents by selected background characteristics

Variable		Males	Females
Number of daughters			
0	None	37	27
1	One	41	34
2 or more	More	22	39
Number of sons			
0	None	40	33
1	One	33	38
2 or more	More	27	29
Ethnic group			
Hindi*		54	54
Punjabi		31	37
Others		15	19
Religion			
Hindu		93	86
Muslim		1	1
Christian		3	6
Sikh		3	7

* Includes Garwalis, Gujaratis, Haryanvis, Rajasthanis, and Kashmiris.

Female respondents showed a higher representation of young, undergraduates than did the males. Slightly over half of the male respondents were skilled workers and among females, about 43 per cent were unemployed. Distribution by family income showed a more or less uniform situation among the two groups. As far as family size was concerned, more male respondents (43 per cent) had no children as compared to 22 per cent of the females, and more female respondents (44 per cent) had two children as compared to males (27 per cent). Considering family composition, 37 and 27 per cent of the male and female respondents respectively had no daughters while 40 and 33 per cent respectively had no sons, and about 60 per cent of the male respondents had one or more sons and daughters, as compared to about 70 per cent of the female respondents.

Overall and aspect-wise opinions

The opinions expressed by the respondents—both overall and with respect to the moral and social aspects of female foeticide are given in Table 2. The findings indicate that both overall and aspect-wise, little more than 60 per cent of the respondents held a highly negative opinion regarding female

foeticide. A significantly higher percentage of the female respondents expressed a positive opinion about female foeticide, both overall and aspect-wise as compared to male respondents among whom none held a positive opinion.

TABLE 2

Percent distribution of respondents by overall and aspect-wise opinions regarding female foeticide

Opinion of respondents	Positive	Somewhat Negative	Highly Negative
Overall	2	36	62
Social aspects	3	35	62
Moral aspects	1	38	61

Differences in opinion with respect to variables

Significant differences in opinions were observed in the case of certain of the variables studied (Table 3). Positive opinions regarding female foeticide were expressed by a significantly higher percentage of the older female respondents and female respondents with three or more children as compared to their male counterparts.

TABLE 3

X^2 values showing significant association between selected variables and opinion of male and female respondents regarding female foeticide

N = 300, Level of significance = 0.05

	Opinions						df	X^2	X^2
	Positive		Somewhat negative		Highly negative			Calculated	Tabulated
	(f)	(%)	(f)	(%)	(f)	(%)			
Overall									
Male (N=150)	(0)	0	(55)	37	(95)	63	2	7.20	5.99
Female (N=150)	(7)	5	(54)	36	(89)	59			
Social aspect									
Male (N=150)	(0)	0	(54)	36	(96)	64	2	8.21	5.99
Female(N=150)	(8)	5	(51)	34	(91)	61			
Sex									
Male (N=150)	(0)	0	(55)	37	(95)	63	2	7.20	5.99
Female(N=150)	(7)	5	(54)	36	(89)	59			

TABLE 3 *(Contd.)*

X^2 values showing significant association between selected variables and opinion of male and female respondents regarding female foeticide

N = 300, Level of significance = 0.05

	Opinions						df	X^2	X^2
	Positive		Somewhat negative		Highly negative			Calculated	Tabulated
	(f)	(%)	(f)	(%)	(f)	(%)			
Age									
Older males (N=59)	(0)	0	(6)	10	(55)	90	2	6.30	5.99
Older females (N=42)	(2)	5	(9)	21	(31)	74			
Number of children									
Overall									
0-1 (N=98)	(0)	0	(23)	23	(75)	77	4	18.75	9.48
2 (N=106)	(1)	1	(9)	8	(96)	91			
3 or 3+ (N=96)	(5)	5	(23)	24	(68)	71			
Females having children									
0-1 (N=33)	(0)	0	(5)	15	(28)	85	4	13.61	9.48
2 (N=66)	(1)	2	(5)	8	(60)	90			
3 or 3+ (N=51)	(5)	9	(14	27	(32)	64			
Males & females having 3 or 3+ children									
Males (n=45)	(0)	0	(9)	20	(36)	80	2	8.97	5.99
Females (N=51)	(5)	10	(14)	27	(32)	63			
Number of sons									
Overall with sons									
0 (N=110)	(0)	0	(28)	25	(82)	75	4	12.76	9.48
1 (N=106)	(4)	4	(10)	9	(92)	87			
2 or 2+ (N=84)	(2)	2	(17)	20	(65)	78			
Males having sons									
0 (N=61)	(0)	0	(21)	34	(40)	66	4	12.48	9.48
1 (N=49)	(0)	0	(4)	8	(45)	92			
2 or 2+ (N=40)	(0)	0	(6)	15	(34)	85			
No sons									
Males (N=61)	(0)	0	(21)	34	(40)	66	2	9.96	5.99
Females (N=49)	(0)	0	(7)	14	(42)	86			
Socioeconomic status									
Females									
LIG (N=50)	(2)	4	(11)	22	(37)	74	4	31.37	9.48
MIG (N=50)	(3)	6	(11)	22	(36)	72			
HIG (N=50)	(1)	2	(2)	4	(47)	94			
HIG									
Males (N=50)	(0)	0	(13)	26	(37)	74	2	10.18	5.49
Females (N=50)	(1)	2	(2)	4	(47)	84			

LIG = Low income group; MIG = Middle income group; HIG = High income group.
No statistically significant differences were found in the opinions of males and females according to occupation, number of daughters and ethnic group.

Negative opinions regarding female foeticide were expressed by a significantly higher percentage of the overall respondents and female respondents with two children as compared to those with no or one child, or three or more children. A significantly higher percentage of both overall and male respondents who had one son also held a highly negative opinion regarding female foeticide as compared to overall respondents and males who had no son or had two or more sons. Similar attitudes were held by a significantly higher percentage of female respondents with no sons as compared to their male counterparts who had no sons.

As regards income, a significantly higher percentage of females belonging to the higher income group held a highly negative opinion as compared to those in the middle and lower income groups, and males belonging to the higher income group.

No significant differences were found between the opinions of respondents regsrding female foeticide in relation to their occupation, number of daughters, and ethnic group.

Opinion regarding causes of and steps to prevent female foeticide

The opinions expressed by the male and female respondents regading the cause(s) of and steps to be taken to prevent female foeticide are presented in Tables 4 and 5 respectively.

TABLE 4

Opinions of respondents regarding causes most responsible for female foeticide

Cause of female foeticide	Percent distribution of respondents		
	Overall (N=300)	Males (N=150)	Females (N=150)
1. Continuation of family name ensured by male child	59	52	65
2. Not allowing girls to take up responsibilities after marriage	53	56	50
3. Daughters' marriages are more expensive	41	39	43
4. Performance of last rites of parents done by sons only	40	38	41
5. No provision of economic security to parents from girls	33	35	31
6. Difficult to find a suitable match for daughters	29	23	35
7. Feeling of insecurity among parents with the birth of a female child	29	29	18

TABLE 4 *(Contd.)*

Opinions of respondents regarding causes most responsible for female foeticide

Cause of female foeticide	Percent distribution of respondents		
	Overall (N=300)	Males (N=150)	Females (N=150)
8. Better fortune ensured for parents by sons	23	23	23
9. Lowered status of mother due to birth of a female child	17	17	17
10. Difficult to bring up girls due to their vulnerable biological structure	17	17	17
11. Lowered family status in society due to birth of a female child	11	10	11
12. Bringing up of female children is expensive	11	10	11

Overall, little more than 50 per cent of the respondents stated that the main causes of female foeticide were the desire to continue the family name through the male child, and not allowing girls to take up family responsibilities after their marriage.

The picture remained the same when males and females were considered separately. However, a higher percentage of the female (65 per cent) than male (52 per cent) respondents felt that the desire to continue the family lineage was the main reason for the prevalence of female foeticide.

On the whole, more than 60 per cent of the respondents felt that the following measures would be most effective for the prevention of female foeticide:

— allow girls to go for higher education
— implement anti-dowry laws strictly
— create public awareness about equal opportunities for both sexes
— provide more facilities for the education of girls
— teach about equality of sexes at the school level.

The above, when considered sex-wise, showed higher percentages in the case of female than in the case of male respondents.

DISCUSSION

As a whole, a little more than 60 per cent of the respondents had a highly negative opinion regarding female foeticide. This was so both for the moral and social aspects of female foeticide. Since female foeticide involves the killing of a human being, people would not generally have a positive feeling towards it. However, one disturbing finding that emerged from this study was that

TABLE 5

Opinions of respondents regarding steps which would be most effective in preventing female foeticide

Steps to prevent female foeticide	Percent distribution of respondents		
	Overall (N=300)	Males (N=150)	Females (N=150)
1. Allow girls to go for higher education	79	69	88
2. Strictly implement anti-dowry laws	69	64	74
3 Create public awareness about equal opportunities for both sexes	68	63	73
4 Provide more facilities for education of girls	68	64	71
5. Teach about equality of both sexes at school level	63	61	65
6 Create public awareness about the harmful consequences of female foeticide	63	58	68
7. Provide anti-dowry education at school and college level	61	63	59
8. Promote idea of reducing expenditure on marriages	57	54	59
9. Impose heavy fines for performing female foeticide	55	57	53
10. Campaign for equality of both sexes on T.V. and radio	55	51	59
11. Create more avenues for women	53	53	53
12. Allow women to earn and support family	49	54	59
13. Restrict sex test to detection of genetic abnormalities only	48	47	49
14. Imprison people for performing female foeticide	45	46	43
15. Raise pay and status of jobs for women	43	40	45
16. Make job reservations for women	41	31	50
17. Educate society about the idea that marriage is not the only goal in a girl's life	40	20	59
18. Restrict sex tests to government hospitals only	36	39	32
19. Allow girls to perform the last rites of their parents	36	28	43
20. Provide special incentives to parents having only female children	30	25	35

38 per cent of the respondents had either a positive or a 'somewhat negative' opinion regarding this practice. A number of factors may have been responsible for the growing positive feeling towards female foeticide; in the present study, boys were considered more important from the religious, social and economic points of view.

A greater number of female respondent groups held positive opinions about female foeticide as compared to their male counterparts. The differences in opinions expressed by male and female respondents can be attributed to the fact that the female respondents themselves may have had to face the consequences of giving birth to a female child, or may have themselves suffered when they were young and treated as an unwanted child. It could also be so because they see other women who have more daughters being ill-treated. Since a higher proportion of the male as compared to female respondents were graduates or postgraduates, these differences could also have been due to the lower educational level of the female respondents.

Older female respondents were found to hold positive opinions regarding female foeticide. The chances of getting an education are less for older females. Further, they are also more conservative in their attitudes, and having been brought up in a male dominated society and in an environment where females are not much respected, they may have developed positive attitudes to female foeticide.

That a higher percentage of female respondents than males in the higher income groups held a highly negative opinion, may be attributed to the fact that the majority of females of higher socioeconomic status were employed. Hence they must have been better educated, more aware of their rights as they were sharing the family's economic responsibilities, and possibly had a say in family matters, and were taking care of younger siblings even after marriage. The male response may be due to their being worried about their wealth and carrying over the family fortune; dowry demands among the rich may also be stronger in lieu of more money being available with the girl's parents.

The suggestions made by 60 per cent of the respondents for preventing female foeticide included the education of girls, strict implementation of laws, and promotion of public awareness about equal opportunities for both sexes. It may be noted that the strict implementation of legal measures such as laws against dowry, restricting sex determination tests to the detection of genetic abnormalities, and imprisonment under a criminal offence of those who practice female foeticide were considered as effective measures by as many as 60 per cent of the respondents.

The debate on sex determination through tests and the subsequent abortion of female foetuses has generated a lot of controversy in academic circles and among researchers. Most women's groups feel that amniocentesis,

sonography, and such other methods should be allowed under strict governmental control and only for the detection of genetic abnormalities. They are trying to convey the social implications of the test through public lectures, the media, poster campaigns, exhibitions, films and publications, because it is realised that mere reforms in the legal or medical fields alone will not do away with the ever-growing phenomenon of female foeticide. Other measures which can be suggested are that social education and medical science development agencies can take the responsibility of seeing that the ratio of male and female children remains balanced; then perhaps, there will not be a need for such barbaric practices as female foeticide. Only public awareness and consciousness raising campaigns can bring about positive results by changing societal values and attitudes towards women.

REFERENCES

1. Anjali: "Prejudice against girls: Abuse of scientific discovery", *Social Welfare*, 34: 10-11 (1987).
2. Patel, V.: "Sex determination and sex pre-selection tests: Abuse of advanced technologies" In *Women in Indian Society*, Rehana Ghadially (ed.), pp.179-85, 1988.
3. Gangrade, K.D.: "Sex determination - A critique", *Social Change*, 23: 63-69 (1988).
4. Mohanty, P.: "On female foeticide", *Social Welfare*, 34(9): 14-16 (1987).
5. Ghosh, S.: "The female child in India : A struggle for survival", *Bulletin of the Nutrition Foundation of India*, pp.1-4, October 1987.
6. Krishnaswamy, S.: "Sex determination and sex pre-selection tests: Abuse of advanced technologies". In *Women in Indian Society*, Rehana Ghadially (ed.), pp.187-95, 1988.

REASONS FOR NOT FEEDING COLOSTRUM AND EFFECTIVENESS OF AN EDUCATIONAL PROGRAMME FOR PROMOTION OF COLOSTRUM FEEDING

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and

MS. SAROJA K.*

INTRODUCTION

Several studies have confirmed that colostrum is the best food for neonates from the nutritional, psychological and immunological points of view[1]. In some of the hospitals abroad, colostrum is fed to the neonate so as to reduce mortality and morbidity rates[2]. Moreover, during the first 45 minutes after the birth, both the mother's and the neonate's senses are in a highly awakened state, and the suckling stimulation rouses the milk secreting reflexes in the mother[3]. Hence, feeding colostrum to the new-born on the first day will rule out any possible problems of having little milk or no milk. Therefore, there is no reason why a neonate cannot be put to breast on the first day.

Although there are many reasons why a healthy full-term neonate who was delivered normally should suckle soon after birth, many mothers insist on not feeding colostrum due to several reasons as reported in a number of studies[1,4,5].

OBJECTIVES

This study then was undertaken as a sincere effort to educate mothers regarding the benefits of colostrum feeding with the aim of evaluating the impact of an educational programme on reducing misconceptions if any, prevalent among them. It was also aimed at investigating the sources and types of misinformation regarding colostrum feeding.

SAMPLE AND METHODOLOGY

From randomly selected antenatal clinics of hospitals and nursing homes in the twin cities of Hubli and Dharwad, pregnant mothers who met the specified criteria set for the selection of the sample were identified and listed. The criteria were a minimum education up to the fifth standard, and at least one child who was delivered normally and not fed with colostrum. From this list, the sample was randomised and divided into the control and experimental groups. The experimental group was further divided into Group A and

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Group B each consisting of 40 respondents. The control group also consisted of 40 respondents. Thus, the total sample size of the study was 120 respondents.

Data regarding the reasons for not giving colostrum at the time of the previous and present deliveries and sources of such reasons were collected both from the control and experimental group of mothers. Experimental Group A was educated through a series of three lectures supported by nine visual aids. Each lecture was spaced one week apart from the other and provision was made to clarify doubts if any, during the discussion period lasting for about ten minutes or more. Experimental Group B was educated through a series of three pamphlets which contained nine illustrations and were mailed at weekly intervals. Provision was made for the respondents to correspond with the research department for clarifying doubts if any. The content of both educational tools, that is the lectures and pamphlets, was the same.

After the respondents delivered, they were personally observed and interviewed in regard to their present neonatal feeding practice, and type and source of misinformation regarding colostrum feeding. The results of experimental Groups A and B were clubbed together before being subjected to statistical analysis for the following reasons:

1. Not much difference was found between experimental Groups A and B in their actual colostrum feeding performance following the present delivery. Twentytwo respondents in experimental Group A and 21 in experimental Group B were found to have fed colostrum to the neonate either exclusively or along with honey and or boiled, cooled water
2. The reasons for not feeding colostrum given by Experimental Groups A and B were almost the same in nature and frequency of being quoted.

Using the paired 't' test, the differences in the number of reasons for not feeding colostrum at the time of the first delivery to the present one were analysed for both experimental and control groups.

RESULTS

Mothers who did not feed colostrum quoted several reasons. In both control and experimental groups, the reasons most frequently cited for not feeding colostrum to the neonate after the previous as well as present deliveries are listed in Tables 1 and 2.

The main reasons for not feeding the neonate with colostrum were:

1. "No milk" which was most frequently quoted by both the control (48.2 per cent) and experimental groups (27 per cent).
2. "Mother's advice", was the next most frequently quoted reason by control group mothers (9.8 per cent) whereas among experimental group mothers, it ranked fourth (7.2 per cent).

TABLE 1

Frequency of reasons for not feeding colostrum and number of live births in the control group

Reasons for not feeding colostrum	No. of live births						Present live birth		Total	
	I		II		III					
	F	%	F	%	F	%	F	%	F	%
No milk	24	48.98	6	100	2	66.67	22	41.00	54	48.20
Mother's advice	9	18.37	—	—	—	—	2	3.71	11	9.83
Nurse's advice	3	6.13	—	—	—	—	5	9.25	8	7.14
Not good for neonate	2	4.08	—	—	—	—	5	9.25	7	6.25
Doctor's advice	3	6.12	—	—	—	—	3	5.56	6	5.36
Fever at delivery	1	2.04	—	—	1	33.33	2	3.71	4	3.57
Self practice*	1	2.04		—	—	—	3	5.56	4	3.57
Sister's advice	2	4.08	—	—	—	—	1	1.85	3	2.67
Mother-in-law's advice	1	2.04		—	—	—	2	3.71	3	2.67
Tradition	1	2.04	—	—	—	—	1	1.85	2	1.78
Child's unable to suckle	1	2.04	—	—	—	—	1	1.85	2	1.78
Not digestable	1	2.04	—	—	—	—	1	1.85	2	1.78
Hospital routine	—	—	—	—	—	—	1	1.85	1	0.90
Free milk powder packet	—	—	—	—	—	—	1	1.85	1	0.90
Friend's advice	—	—	—	—	—	—	1	1.85	1	0.90
Neighbour's advice	—	—	—	—	—	—	1	1.85	1	0.90
Not clean	—	—	—	—	—	—	1	1.85	1	0.90
Lack of sufficient advice	—	—	—	—	—	—	1	1.85	1	0.90
Total	49	100.00	6	100.00	3	100.00	54	100.00	112	100.00

F = Frequency;

* Self-practice refers to the behaviour of not feeding colostrum which has already been practiced once or more than once

3. "Nurse's advice", recorded the third highest frequency in the control group (7.1 per cent) whereas it ranked fifth (6.2 per cent) in the experimental group.
4. The belief that colostrum is not good for the neonate was the fourth most frequently cited reason by the control group (6.2 per cent); in the experimental group, the same reason was quoted with the third highest frequency (9.4 per cent).
5. "Doctor's advice" was the fifth most cited reason among control group mothers (5.4 per cent), but was found to be the second highest quoted

TABLE 2

Frequency of reasons for not feeding colostrum and number of live births among the experimental group*

Reasons for not feeding colostrum	Number of live births						Present live births		Total	
	I		II		II					
	Freq-uency	%	Freq-uency	%	Freq-uency	%	Freq-uency	%	Freq-uency	%
No milk	26	24.80	7	21.87	3	37.5	16	34.04	52	27.08
Doctor's advice	19	18.09	5	15.62	3	37.5	5	10.65	32	16.66
Not good for neonate	7	6.66	3	9 37	—	—	8	17.02	18	9.38
Mother's advice	7	6.66	2	6.26	—	—	5	10.65	14	7.29
Nurse's advice	8	7.63	1	3.12	1	12.5	2	4.26	12	6.25
Grandmother's advice	4	3.80	2	6.26	—	—	2	4.26	8	4.16
Sister's advice	5	4.78	1	3.12	—	—	1	2.12	7	3.65
Sticky nature	4	3.80	2	6.26	1	12.5	—	—	7	3.65
Unhygienic/dirty/bad	4	3.80	2	6.26	—	—	—	—	6	3.12
Tradition	2	1.90	1	3.12	—	—	2	4.26	5	2.60
Neighbour's advice	2	1.90	1	3.12	—	—	2	4.26	5	2.60
Not digestable	3	2.87	2	6.26	—	—	—	—	5	2.60
Mother-in-laws's advice	2	1.90	1	3.12	—	—	1	2.12	4	2.08
Aunt's advice	1	0.96	1	3.12	—	—	1	2.12	3	1.58
Friend's advice	2	1.90	—	—	—	—	1	2.12	3	1.58
Lack of sufficient advice	2	1.90	—	—	—	—	—	—	2	1.04
Thick and yellowish	2	1.90	—	—	—	—	—	—	2	1.04
Causes disease	1	0.95	1	3.12	—	—	—	—	2	1.04
Fever at delivery	1	0.95	—	—	—	—	1	2.12	1	1.04
Stored milk	1	0.95		—	—	—	—	—	1	0.52
Milk secreted only on third day	1	0.95	-	-	—	—	—	—	1	0.52
Bitter in taste	1	0.95	—	—	—	—	—	—	1	0.52
Total	105	100 00	32	100.00	8	100.00	47	100.00	192	100.00

* The experimental group includes group A and group B

reason among experimental group mothers (16.7 per cent).

Table 3 presents the results of the paired 't' test used to investigate whether the educational programme to promote colostrum feeding had reduced the misconceptions and sources of misinformation regarding colostrum feeding after the present delivery as compared to previous deliveries.

TABLE 3

Mean values of the number of reasons quoted for not feeding colostrum*

Group	Mean value	't' value
Control	0.05	0.4222**
Experimental	0.775	9.748 +

* The experimental group includes Group A and Group B
\+ Significant at .01 level
** Not significant

The total number of reasons quoted by control group mothers for not feeding the neonate with colostrum increased from 49 given at the time of the first delivery to 54 stated during the present delivery (Table 1). However, in the experimental group, the corresponding numbers showed a reduction from 105 to 47. On actual observation, it was found that 53.7 per cent of experimental group mothers had fed colostrum either exclusively or along with honey or boiled and cooled water. In contrast, none of the mothers in the control group had done so.

The mean value of the number of reasons quoted for not feeding colostrum during the first and present delivery was found to be insignificant in the case of the control group which did not receive any direct education from the researchers. On the other hand, in the experimental group, which was exposed to an educational programme regarding the importance of colostrum feeding, the frequency of reasons quoted for not feeding colostrum reduced significantly between the first and present deliveries.

DISCUSSION AND CONCLUSION

The reasons for not offering colostrum to the neonate were both a result of the misconceptions harboured by the respondents as well as advice given by certain people like the mother, nurse, doctor etc. who acted as sources of misinformation.

Tables 1 and 2 clearly indicate that "no milk" was the main reason given by the mothers for not feeding colostrum to the neonate. This reason had the highest frequency of being quoted by both control and experimental groups.

The observation is in conformity with the results obtained by several other workers[1,2,8,9]. The present finding may be attributed to the fact that most of the mothers believed that lactation starts only 2-3 days after delivery and did not consider colostrum as milk which could be fed to the neonate. It is also possible that the quantity of colostrum produced is only 10 ml to 40 ml per day which is usually interpreted by the mothers either as 'extremely insufficient' or as 'no milk at all'.

The other most frequently quoted reasons were "nurse's advice", "doctor's advice" and "mother's advice". This points to the need for educating elder female family members, medical and paramedical personnel such as doctors and nurses, among other health workers, regarding the significnce of colostrum feeding. This is important because these are the people who will be in a position to effectively advise, influence and sometimes even order the young mother about what she should feed to her neonate. The lack of sufficient knowledge about the importance of colostrum feeding even among doctors and nurses which this study implies, suggests an immediate need to include scientific information on the importance of colostrum feeding in the syllabi of nursing and medical education. This has also been recommended by other workers[6,10].

The reduction in the number of misinformation regarding colostrum feeding observed between the first and present deliveries in the case of the experimental group of mothers who had received educational inputs was reflected in the positive colostrum feeding behaviour of the mothers in the experimental group. The results indicate thatjmothers can be motivated to breastfeed by educating them. This is in conformity with the results of other such educational programmes[11,12], and points to the fact that reasons for not feeding colostrum which arise out of misconceptions, lack of knowledge and misguidance can be reduced to a great extent through proper education. Hence appropriate educational programmes are needed not only to motivate mothers to feed colostrum but also to educate doctors, nurses and elder female family members.

REFERENCES

1. World Health Organization· "The contemporary pattern of breastfeeding". *Report on the WHO collaborative study on breastfeeding*, World Health Organisation, Geneva, 1-61 (1981).
2. Clavano, N.R.: "The results of change in hospital practices: A paediatrician's breastfeeding campaign in Philippines". *Assignment Children*, UNICEF Publication, Reprint No. 55/56, 139-151 (1981).
3. Raphael, D.: "*Breastfeeding and food policy*". In *Hungry World*, Academic Press, London, 199 (1979).
4. Kaur, S., Puri, R. and Bajaj, S.: "Feeding practices of children of different castes in rural areas of Ludhiana Block", *Indian Journal of Pediatrics*, 50(405): 371-374 (1983).

5. Bax, M.C.O. and Hart, H., "Encouraging breastfeeding", *Nutritional Abstr. Rev.*, Series A, 47(1):624 (1986).

6. Agarwal, D.K., Agarwal, K.N. and Khare, B.B.: *Report on Current Status of Infant and Early Childhood Feeding Practices*, Rekha Printers Pvt. Ltd., New Delhi (1986).

7. Datta Banik, N.D.: "Breastfeeding and weaning practices of pre-school children in urban community in Delhi", *Indian Pediatrics*, 12(7):569-574 (1975).

8. Dharam, B., Sharma and Lahori, U.C.: "Some aspects of infant rearing practices and beliefs in the urban and rural areas of Jammu and Kashmir", *Indian Pediatrics*, 14(7):511-518 (1977).

9. Gurudeva, R.K., Gargye, A.K. Singh, S.B., Rajput, V.J., and Tiwari, H.L.: "Infant feeding patterns in Rewa", *Indian Journal of Pediatrics*, 49(401):815-818 (1982).

10. Ebrahim, G.J.: *Nutrition in Mother and Child Health*, Macmillan Press Ltd., London, 54-82 (1983).

11. Sloper, K., McKean, L. and Baum, J.B.: "Pattern of factors influencing breastfeeding". In *Human Milk in the Modern World*, Jelliffe, D.B. and Jelliffee P.E.F.(eds.), The English Language Book Society and Oxford University Press, Oxford, UK (1978).

12. Kaplwitz, D.D. and Olson, C.M.: "The effects of an educating programme on the decision to breastfeed", *Journal of Nutrition Education*, 15(2):61-65 (1983).

ATTITUDES OF HINDUS AND MUSLIMS TO FAMILY PLANNING

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INTRODUCTION

There is a common belief that religion tends to shape the individual's lifestyle in general. As such, it is expected to influence individual orientation and attitudes towards family planning and reproductive behaviour as well. The views, attitudes and practices related to family planning prevalent among different religious groups namely, the Hindus, Muslims and Christians have been explored by a number of investigators[1-8].

Kirk[6] found that Muslims in most of parts of the world commonly generate high fertility, often higher than that of their non-Muslims neighbours. Bhowmik[9] in the context of Indian society, observed that any sexual discussion in a secular context was strongly condemned, but sexual discussions which formed a part of religious situations were not criticised in any way. This indicated that religious ideas could be used to introduce young people to family planning practices. In a rural sample of 429 Hindu and Muslim men whose wives were in the reproductive ages of 15-44, Saxena[7] found that 64 per cent of the Hindus preferred small families as compared to 29 per cent of the Muslims.

OBJECTIVES

Inspite of the general agreement among the above-mentioned studies which showed a greater acceptability of the idea of family planning among Hindus than Muslims, it was considered meaningful to explore the possibility of a regional bias operating in their attitudes towards family planning. On the basis of these studies a one tailed hypothesis was formulated that: Hindu students will have more positive attitudes towards family planning than Muslim students.

SAMPLE AND METHODOLOGY

The sample comprised of 50 Hindu and 50 Muslim undergraduate college students of the district town of Champaran in the state of Bihar. The mean age of the Hindu students was 19.56 years (SD $\pm$ 2.91) and the mean age of the Muslim students was 19.40 years (SD $\pm$ 2.47). Attitude to family planning (ATFP) was measured by using the scale devised by Sinha[10] consisting of 52 items.

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RESULTS AND DISCUSSION

The hypothesis that Hindu students would have more positive attitudes towards family planning than Muslim students was tested by computing two-way ANOVA. The columns contained scores for four different aspects of family planning and the rows, dichotomy of Hindu and Muslim students. Table 1 presents a summary of the statistical findings.

TABLE 1

Two-way ANOVA for Hindu and Muslim students on attitude to family planning

Source of variation	df	Sum of squares	Mean sum of squares	F-ratio
Between groups	3	824.54	274.84	54.75
Within groups	396	1986.60	5.02	
Total	399			
Between rows		795.24	795.24	158.41
Between columns		6.33	2.11	0.42*
R × C		22.94	7.65	1.52*

* Not significant even at .05 level of confidence

The results of Table 1 evidently show that the F-ratio for between groups (F=54.75) and between rows (F=158.41) were statistically significant. However, the F-ratio between columns (F=.42), and the interaction effect or the residual variance (F=1.52) were statistically insignificant.

In order to examine whether or not the mean difference between the scores of the Hindu and Muslim students were statistically significant in respect of each of the dimensions of the scale, namely, self and spouse, 'children's welfare, 'family welfare, and 'concern for social and moral values', t-ratios were computed. Table 2 presents a summary of the statistical findings of this analysis.

TABLE 2

Comparison of the mean scores of Hindu and Muslim students on different dimensions of attitude to family planning

Dimension of attitude	Group	No.	Mean	SD	SE	t-ratio (df = 98)
Self and spouse	H	50	10.44	2.85	.40	5.02
	M	50	7.68	2.31	.33	
Children's welfare	H	50	10.40	1.90	.27	
	M	50	8.18	2.67	28	4.72
Family welfare	H	50	10.80	1.65	.23	
	M	50	7.24	2.73	.39	7.91
Social and moral values	H	50	10.66	1.85	.26	
	M	50	7.92	2.66	.38	5.96

H = Hindu; M = Muslim

Table 2 clearly shows that the Hindu and Muslim students differed significantly in terms of their attitude to family planning, with respect to the dimensions of 'self and spouse' ($t = 5.02$, $df = 98$), 'children's welfare' ($t = 4.72$, $df = 98$), 'family welfare' ($t = 7.91$, $df = 98$), and 'concern for social and moral values' ($t = 5.91$, $df = 98$). The statistical findings were in the hypothesised direction. It seems quite reasonable to infer that religious undercurrents are quite potent in influencing attitudes to family planning.

SUMMARY

The present study was undertaken to examine the role of religion in shaping attitudes towards family planning in a sample of 50 Hindu and 50 Muslim undergraduates college students of the district town of Champaran in Bihar. It was hypothesised that Hindu students would have more positive attitudes towards family planning than Muslim students. Family planning attitudes as measured by the scale developed by Sinha[10] confirmed the hypothesis. It seems quite reasonable to infer that religious undercurrents are quite potent in shaping family planning attitudes.

REFERENCES

1. Agarwala, S.N.: "Social and cultural factors affecting fertility in India", Proceedings of the Seventh Conference of the International Planed Parenthood Federation, Singapore, 1963.
2. Agarwala, S.N.: "Social and cultural factors affecting fertility in India", *Population Review*, 8: 73-78 (1964).
3. Aitken, Annie and Stoeckel, J.: "Dynamics of the Muslim-Hindu differential in family planning practices in rural East Pakistan", *Social Biology*, 18:268-276 (1971).
4. Dhillon, P.K.. "A study of attitudinal differences on family planning of two cultural groups", *Manas*, 15(1):25-36 (1968).
5. Karkal, Malini: "Cultural factors influencing fertility: Post-partum abstention from sexual intercourse," *Man in India*, 51:15-26 (1971).
6. Kirk, D.: "Factors affecting Moslem mortality". In *Family Planning and Population Programmes*. Eds. B. Berelson et al., pp 561-579, University of Chicago Press, 1966.
7. Saxena, G.B.: cited by Dave and Sadashivaiah in "*Family Size and Quality of Life - Social Change*, Vol. II, No. 3 & 4 p.39, 1981.
8. Chowdhary, Rafique Huda (1971) "Differential fertility by religious group in East Pakistan", Social Biology 18 : 188-191.
9. Bhowmik, A. and Bhowmik, K.L.: "Value orientation and family planning", *Society and Culture*, 6(2):118-122 (1975).
10. Sinha, R.B.N.: "A study of personalistic and motivational undercurrents of high and low fertility behaviour: Ph.D. Thesis, Patna University, Patna, 1986.

INFANT AND CHILD MORTALITY AMONG ROMAN CATHOLICS IN BOMBAY

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INTRODUCTION

Interestingly, like baptisms and nuptials, the burial records maintained in Roman Catholic Churches offer interesting material for studying the levels, trends, seasonal variations and sex differentials in mortality among the Roman Catholic population. It is, however, not possible to compute the traditional demographic indicator - crude death rate - through parish records because most often the denominator population of Roman Catholics is not available for the parishes in which burial records are available. It is unfortunate that even the present-day parish priests do not seriously consider undertaking a census of their own parish. However, they have been providing guestimates of their parish population for recent periods. These have been published by the Catholic Bishops' Conference held in India in the form of a directory called, "Catholic Directory of India". The total population published in the directory has been questioned by the researcher[1]. As such then, the analysis has to be confined to the numerator data from burial records. This is a major limitation of the study.

The United Nations and the World Health Organisation have defined death as follows: "Death is the permanent disappearance of all evidence of life at any time after birth has taken place (post-natal cessation of vital functions without capacity of resuscitation)[2]."

As such, death can occur only after a live birth. The definition of death does not include any death prior to live birth. The United Nations defines a live birth as follows: "Live birth is the complete expulsion or extraction from the mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation breathes or shows any other evidence of life, such as beating of the heart, pulsation of umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered as live born"[3]. It is clear then that any death prior to live birth is not taken as death. Thus abortions and still births are not referred to as deaths but as foetal deaths.

The registration of deaths plays an important role in controlling the mortality crisis in any population. The age at death, sex, marital status and cause

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of death are areas of interest for demographers and public health personnel as they provide important information for studying the levels, trends and differentials in mortality as also the epidemiology of diseases.

Tradition exists in the Roman Catholic Church that every dead body should be accompanied by relatives and friends to the church to be blessed by the parish priest. Every burial is done in the cemetery following prayers which include the celebration of the Holy Eucharistic Mass in the church. As discussed elsewhere by the author, there is always a gap between the date of birth and the date of baptism[3], which may lead to the possibility of under-registration of births because some children may die before they are baptised. However, it is the general impression that the number of deaths registered in a parish is always more complete and more reliable than the number of births since death for any Roman Catholic necessitates the burial of the body with attendant ceremonies.

To overcome this problem of under-registration in baptism records, the author cross-checked both burials and baptisms to find out how many children had been recorded as having died without being baptised. Such births which are not registered in baptism records are referred to as "dummy births". This methodology helped provide the correct number of births reported in the parish. Th above methodology was applied by Wrigley and Schofield[4] in their study of English Parish records. Though the registration is complete, the data maintained in the burial registers cannot be considered to be wholly reliable. The author's experience with the four Roman Catholic burial records in the Archdiocese of Bombay, indicates that while information such as the number of deaths, sex and marital status of the deceased are reliable, age (except for infants), cause of death and occupational data are subject to big errors depending upon the person who furnishes information to the parish priest regarding the dead.

SAMPLE AND METHODOLOGY

The data for this study were collected from the burial records available in the Archdiocese of Bombay, Bombay, India. The four parishes investigated were: (1) Holy Cross Parish, Kurla; (2) Our Lady of Perpetual Succor Parish, Chembur; (3) Saint Anthony of Lisbon Parish, Mankhurd; and (4) Saint Sebastian Parish, Marouli. The number of deaths registered deaths in each parish for the periods for which records were available are presented in Table 1.

As Table 1 indicates, among the four parishes investigated, the Kurla parish recorded the maximum number of burials (3752), followed by those in Marouli (1034), Mankhurd (873) and Chembur (713).

TABLE 1

Salient characteristics of the parishes under study in the Archdiocese of Bombay

Parish	Place	Period covered	Registered baptisms	Population in 1982
Holy Cross	Kurla	1919-1984	3752	10000
Our Lady of Perpetual Succor	Chembur	1946-1984	713	4892
Saint Anthony of Lisbon	Mankhurd	1869-1984	873	3000
Saint Sebastian	Marouli	1888-1984	1034	3500

RESULTS AND DISCUSSION

Infant mortality rate

The infant mortality rate (IMR) is considered to be a powerful indicator of the socioeconomic and health conditions of any population, and is therefore always higher in developing countries as compared to developed countries. The burial records maintained in each parish provide information regarding deaths by age. As mentioned earlier, the age at death for infants as reported in the burial registers is comparatively more reliable than that reported for adults. The needed denominator data for the computation of IMR namely, the actual number of births, can be derived from the baptismal registers by excluding late and adult baptisms and including dummy births. Thus, the parish registers can provide reliable and accurate data for the calculation of infant mortality rate.

$$\text{Infant Mortality Rate (IMR)} = \frac{\text{Number of deaths registered among children before they celebrate the first birthday in a particular parish in a year}}{\text{Number of births registered in the same parish during the same year}} \times 1000$$

Let us discuss in greater detail, the two indices used for studying infant mortality namely, the infant mortality rate (IMR) which is based on the registered number of deaths (less than one year) and the registered number of births, and the percentage of infant deaths (less than one year) to total registered deaths during a particular period, referred to as PID.The IMRs and PID values for the four parishes are presented in Table 2.

The Kurla parish experienced a drastic decline in its male and female

TABLE 2

Infant mortality rates and percentage of infant deaths in the parishes under study

Period	Infant mortality rate (IMR)			% infant deaths to total		
	Male	Female	Total	Male	Female	Total
Kurla Parish						
1925-34	213.16	171 83	193.20	32.02	26.75	29.52
1935-44	166.14	139.13	152.11	22.27	22.02	22.15
1945-54	89.39	75.84	83.13	19.34	14.63	17.03
1955-64	43.00	40.29	41.67	13.48	14.89	14.11
1965-74	36.90	32.99	34.99	11.33	13.01	12.04
1975-84	40.69	32.15	36.59	6.15	7.48	6.65
Chembur Parish						
1946-64	28.99	19.54	24.22	22.86	22.45	22.69
1965-74	36.71	47.71	41.97	13.82	20.33	16.73
1975-84	64.29	38.99	51.40	14.44	12.88	13.79
Mankhurd Parish						
1869-74	142.86	66.67	103.45	25.00	8.33	15.00
1875-84	0.00	45.45	23.81	0.00	6.25	3.23
1885-94	208.33	312.50	250.00	17.86	19.23	18.52
1895-1904	0.00	55.56	27.03	0.00	9.09	3.45
1905-14	43.48	115.38	81.63	2.78	14.29	7.02
1915-24	384.62	263.16	312.50	50.00	83.33	62.50
1925-34	43.48	38.46	40.82	7.14	12.50	9.09
1935-44	47.62	24.39	32.26	4.55	7.69	5.71
1945-54	142.86	106.67	124.14	25.64	23.53	24.66
1955-64	93.96	88.76	91.19	22.95	36.59	28.43
1965-74	47.34	40.11	43.67	13.91	20.29	16.30
1975-84	61.92	62.86	62.41	13.51	21.57	16.80
Marouli Parish						
1925-34	200.00	200.00	200.00	19.23	12.50	15.52
1935-44	156.86	30.30	85.47	27.59	10.00	20.41
1945-54	103.90	109.38	106.38	32.00	20.59	25.42
1955-64	57.02	33.20	44.78	21.67	21.62	21.65
1965-74	51.20	41.03	45.71	20.24	22.54	21.29
1975-84	11.24	17.70	14.20	2.78	5.13	3.76

infant mortality rate during the period under investigation. The IMR was 193 during 1925-34; it declined to 83 during 1945-54, and further declined to 37 during 1975-84 (Table 2). Also, as expected, it was consistently higher for males compared to females; females are known to be biologically stronger and healthier than males in the early years of life. The trend reveals that a lot of improvement has taken place in the general health situation among the

Roman Catholics of Bombay. The decline in infant mortality was also reflected in the percentage of infant deaths to total deaths (PID). This figure was 30 during 1925-34, declined to 17 during 1945-54 and to 7 during 1975-84—PID among females was comparatively higher than that among males because the total number of deaths among females was relatively lower.

The Chembur parish recorded a higher IMR than the Kurla parish between 1965 and 1984 (Table 2). The recent period (1975-84) witnessed fewer infant deaths among females as compared to males. When we compare the Chembur parish with the Kurla parish, the former is found to have experienced a higher IMR but has considerably reduced the proportion of infant deaths to total deaths; PID was 23 during 1946-64 and declined to 14 during 1975-84.

Surprisingly, the Mankhurd parish registered the highest IMR as compared to all the other parishes under study (Table 2). Though much variance has been observed in the rate over the years, recent periods have revealed an increase in the IMR. This may be because the parish is located in the city slums, where there is high overcrowding and extremely unhygienic conditions, resulting in higher infant deaths. During 1975-84, the neo-natal mortality was lower as compared to post neo-natal mortality. In other words, the reason for the higher IMR can be attributed more to exogenous factors rather than to endogenous factors (more discussion follows in the next section). Though infant mortality has shown an increase in recent years, the percentage of infant deaths to total deaths has experienced a continuous decline after 1955, implying a decrease in overall mortality levels.

The Marouli parish documented a drastic decline in infant mortality during the sixty-year period—from 200 during 1925-34 to 14 during 1975-84 (Table 2). After the 1960s, it experienced a continuous decline in IMR among both males and females. Like other parishes, in recent decades, it also recorded a higher IMR among males than among females, and the percentage of infant deaths to total deaths also underwent considerable change. For example, PID was 25 during 1945-54, declined to 22 during 1965-74, and to 4 during 1975-84. Deaths of infants were relatively fewer in this parish than deaths of children or adults.

Among the four parishes under study, the lowest infant mortality was observed in the Marouli parish, followed by the Kurla, Chembur and Mankhurd parishes during 1975-84 (Table 2). Differences in infant mortality can be found if the parishes are in different stages of demographic regime—(1) the decline in the number of births is slightly higher than the decline in the number of infant deaths (for instance, the Kurla parish registered a 43 per cent decline in the number of births during 1975-84 and a 41 per cent decline in the number of infant deaths during the same period; (2) a drastic decline in the number of births accompanied by a much lower decline in the number of infant deaths (the Chembur parish documented a 22 per cent decline in the number of births

during 1975-84 and a concomitant 4 per cent decline in the number of deaths); (3) a low decline in the number of births with an increase in the number of infant deaths (the Mankhurd parish recorded a 2 per cent decline in the number of births during 1975-84 and a 4 per cent increase in the number of infant deaths; or (4) a moderate decline in fertility along with a tremendous decline in the number of infant deaths (the Marouli parish registered a 32 per cent decline in the number of births with a 79 per cent decline in the number of deaths). This explains why the decline in IMR is not similar in the study parishes. This has been discussed elsewhere in greater detail by the author[3]. But, a lower percentage of infant deaths to total deaths was observed in the Marouli parish, followed by the Kurla, Mankhurd and Chembur parishes.

Neo-natal and post neo-natal mortality

In this section, an attempt has been made to study the two components of infant mortality. The period between birth and the end of the first month of life is a particularly hazardous one, as the fetus and young infant are subject to heavy risks of mortality either due to genetic factors or damage occurring during gestation or birth. Mortality during the first year of life is frequently divided into neo-natal mortality, namely, that occurring in the first month of life and post neo-natal mortality, namely, that occurring during the remainder of the year. We shall discuss the neo-natal and post neo-natal mortality rate among the Roman Catholics in the Archdiocese of Bombay.

$$\text{Neo-natal mortality rate} = \frac{\text{Total number of deaths occurring among infants in a parish before they complete one month of life in a particular period at a parish}}{\text{Total number of registered births in a particular period in a parish}} \times 1000$$

$$\text{Post neo-natal mortality rate} = \frac{\text{Total number of infant deaths occurring in a parish from 30 days to 365 days in a particular period}}{\text{Total number of registered births in a parish in a particular period}} \times 1000$$

The distinction between neo-natal and post-neo-natal mortality serves roughly to identify the endogenous and exogenous components of infant mortality. The endogenous factors are related to the formation of the foetus in the womb, and are therefore, mainly biological in nature. They include the age of the mother, birth order, the period of spacing between births, prematurity. maternal age, weight at birth, and multiple births. Post neo-natal mortality occurs mostly because of exogenous causes which may be social, cultural, economic and environmental. It happens mainly due to diarrhoea, enteritis, bronchitis, pneumonia, poor hygiene, over-crowding and congestion, insanitary

surroundings, lack of proper sunshine and fresh air etc. which lead to infections and contagious diseases. Today, it is possible to control both neo-natal and post neo-natal deaths in any population to a large extent. A study conducted by the Centre for Development Studies, Trivandrum, using the annual series of mortality data available from the Sample Registration System, reveals that the percentage decline in post neo-natal mortality for India is very high whereas the decline in neo-natal deaths is not at all impressive for the period 1970-85[5].

Keeping this in mind, neo-natal and post neo-natal mortality were analysed among Roman Catholics in the sample parishes of the Archdiocese of Bombay. The results are presented in Table 3.

TABLE 3

Neo-natal and post-neo-natal mortality rates in the parishes under study

Period	Neo-natal mortality rate			Post neo-natal mortality rate		
	Males	Females	Total	Males	Females	Total
Kurla Parish						
1925-34	152.63	121.13	137.41	60.53	50.70	55.78
1935-44	112.85	89.96	100.90	53.29	49.28	51.20
1945-54	43.94	40.56	42.38	45.45	35.27	40.75
1955-64	25.00	19.63	22.36	18.00	20.66	19.31
1965-74	18.00	16.97	17.50	18.90	16.02	17.50
1975-84	31.30	15.23	23.58	9.39	16.92	13.01
Chembur Parish						
1946-64	12.68	7.10	9.87	16.30	12.43	14.35
1965-74	27.97	38.17	32.85	8.74	9.54	9.12
1975-84	45.24	34.40	39.72	19.05	4.59	11.68
Mankhurd Parish						
1869-74	142.80	0.00	68.97	0.00	66.67	34.48
1875-84	0.00	0.00	0.00	0.00	45.45	23.81
1885-94	125.00	187.50	150.00	83.33	125.00	100.00
1895-1904	0.00	55.56	27.03	0.00	0.00	0.00
1905-14	43.48	76.92	61.22	0.00	38.46	20.41
1915-24	384.62	263.16	312.50	0.00	0.00	0.00
1925-34	43.48	38.46	40.82	0.00	0.00	0.00
1935-44	47.62	24.39	32.26	0.00	0.00	0.00
1945-54	42.86	40.00	41.38	100.00	66.67	82.76
1955-64	33.56	41.42	37.74	60.40	47.34	53.46
1965-74	14.79	28.65	21.83	32.54	11.46	21.83
1975-84	34.06	25.71	29.72	27.86	37.14	32.69

TABLE 3 *(Contd.)*

Neo-natal and post-neo-natal mortality rates in the parishes under study

Period	Neo-natal mortality rate			Post neo-natal mortality rate		
	Males	Females	Total	Males	Females	Total
Marouli Parish						
1925-34	40.00	100.00	66.67	160.00	100.00	133.33
1935-44	78.43	15.15	42.74	78.43	15.15	42.74
1945-54	12.99	78.13	42.55	90.91	31.25	63.83
1955-64	39.47	24.90	31.98	17.54	8.30	12.79
1965-74	24.10	17.95	20.78	27.11	23.08	24.93
1975-84	7.49	8.85	8.11	3.75	8.85	6.09

The Kurla parish registered a phenomenal decline in neo-natal and post neo-natal mortality rates but the quantum of decline was highest in the case of neo-natal deaths. Between 1925 and 1944, the Kurla parish witnessed a high neo-natal death rate as compared to post neo-natal deaths, suggesting that the former made a larger contribution to infant mortality than the latter during this period (Table 3). However, in the subsequent period—1945-84—post neo-natal deaths exceeded neo-natal deaths.

Another distinguishing feature observed in this parish was that the neo-natal mortality rate for males was comparatively higher than that for females. This indicates that females are biologically stronger and healthier than males in the early days of life. Except for some years, the post-neo-natal rate also followed the same pattern of higher mortality among males than females. The increased risk of mortality for females over males was mainly after the first year of life.

The Chembur parish presented a different picture. The neo-natal mortality rate increased from 10 to 40 during 1946-84, and was comparatively higher for males than for females (Table 3). Post neo-natal mortality exhibited a definite decline from the 1946-64 level during 1975-84 as compared to the period 1965-74. One point that can be brought out is that in the recent past (1975-84), males experienced more neo-natal and post neo-natal deaths compared to females. That neo-natal deaths contributed more towards the infant death rate than post neo-natal deaths during 1975-84, was in contrast to the situation in the Kurla parish.

The Mankhurd parish was marked by high fluctuations in the neo-natal and post neo-natal rates, but showed definite declines in recent periods (Table 3). The quantum of decline was greater among neo-natal than post neo-natal deaths. Though fluctuations in male-female differences among these death rates were found during the different time periods for which data were available,

neo-natal and post neo-natal deaths in general, were observed to be higher among males than among females. In some decades, both males and females registered only neo-natal or post neo-natal deaths. More realistically, in the first half of the twentieth century, the Mankhurd parish experienced more deaths of infants before the completion of one month rather than during the next 11 months.

The Mankhurd parish data have shown a very high fluctuating trend because of two reasons. This is the oldest parish under study which has data across a 105-year period, 1869-1984. It registered the least number of deaths due to the small number of registered infant deaths. The population of this parish also was 3000 in 1982. For instance, neo-natal mortality declined from 312.50 in 1915-24 to 40.84 in 1925-34. The highest mortality during this period can be explained by looking at the local history of Bombay. The Bombay Presidency had a virulent plague and influenza during this period. J.T. Marten writes in the report of the Census of India, 1921 that: "In Bombay Presidency, plague was particularly virulent in 1911, 1916, 1917 and 1918" (Census of India, 1921, Vol.I, Part I). The Census of India 1931 notes that, "up to the end of 1921 public health was very bad. Cholera, plague and malaria caused exceptional mortality. The year 1928-29 brought much unhealthiness from cholera, plague, small pox, influenza and malaria" (Census of India, 1931, Vol. I, Part I).

Marouli is a typical parish which recorded a continuous decline in the neo-natal mortality rate without any break during the period under investigation. The post neo-natal mortality rate was 43 during 1925-34 and it declined to 6 during 1975-84. Before the 1950s, the neo-natal mortality rate among females was comparatively higher than that among males but the study shows that this trend has been reversed in recent years. Post neo-natal mortality showed some fluctuations during 1945-54, but the overall trend indicates a decline which is higher among post neo-natal deaths compared to neo-natal deaths. More recently, post neo-natal mortality among male infants has been found to be higher than among female infants, but the differences are small.

Among the four parishes under investigation, the Marouli parish recorded the lowest neo-natal mortality rate during 1975-84, followed by the Kurla, Mankhurd and Chembur parishes. On the other hand, it also registered the lowest post neo-natal mortality, followed by the Mankhurd, Kurla and Chembur parishes.

Child Mortality

It is reasonable to expect that there would be significant mortality differences among various age groups in the population. Age specific mortality rates for developing countries reveal that mortality is very high in infancy

TABLE 4

Percentage of child deaths to total deaths in the parishes under study

Period	Percentage of child deaths to total deaths (0-14)		
	Males	Females	Total
Kurla Parish			
1925-34	51.38	44.74	48.23
1935-44	37.39	39.91	38.60
1945-54	48.85	44.56	46.74
1955-64	36.99	36.64	36.83
1965-74	23.48	31.97	27.10
1975-84	10.4	16.54	12.70
Chembur Parish			
1946-64	37.14	51.02	42.86
1965-74	32.89	37.40	34.91
1975-84	21.93	20.45	21.32
Mankhurd Parish			
1869-74	50.00	25.00	35.00
1875-84	26.67	37.50	32.26
1885-94	42.86	34.62	38.89
1895-1904	5.56	27.27	13.79
1905-14	13.89	33.33	21.05
1915-24	50.00	83.33	62.50
1925-34	21.43	25.00	22.73
1935-44	18.18	15.38	17.14
1945-54	46.15	38.24	42.47
1955-64	50.02	58.54	53.92
1965-74	30.43	55.07	39.67
1975-84	17.57	39.22	26.40
Marouli Parish			
1925-34	30.77	37.50	34.48
1935-44	44.83	50.00	46.94
1945-54	52.00	50.00	50.85
1955-64	36.67	45.95	40.21
1965-74	28.57	32.39	30.32
1975-84	10.19	12.82	11.29

and old age. Child mortality is defined as the death of children who die before they celebrate their fifteenth birthday. In this section, child mortality is measured as the percentage of child deaths to total deaths (PCD) during a specific period of time.

The percentage of children who died between 0-14 years among the total deaths for the four parishes are presented in Table 4. As seen from the table,

the Kurla parish showed a drastic decline in PCD values. Child deaths accounted for 48 per cent of total deaths during 1919-24, 28 during 1965-74 and 13 during 1975-84. There was little difference between male and female rates.

When the percentage of female child deaths to total female deaths were examined, the figures were higher for females compared to males. This means that deaths among female children were higher than deaths among male children. The Chembur parish also exhibited similar findings, though the decline in PCD values was not so impressive. The percentage of child deaths to total deaths (PCD) was 35 during 1955-64, and declined to 21 during 1975-84, but the overall percentage was 32 which was lower than that for the Kurla parish (Table 4).

The Mankhurd parish also registered a normal decline in child mortality compared to its neighbourhood parish, Marouli. Both these parishes registered declines in child mortality but the quantum of decline was higher in Marouli than in Mankhurd. The percentage of child deaths to total deaths (PCD) was 39 during 1985-94, 23 during 1925-34, 40 during 1965-74 and 26 during 1975-84 in Mankhurd, whereas in Marouli they were 34 during 1925-34, 30 during 1965-74 and 11 during 1975-84. The overall percentage of deaths among children was 35 in both the Mankhurd and Marouli parishes (Table 4).

The foregoing analysis on child mortality reveals indirectly, a drastic decline in deaths among children aged 0-14. One of the possible explanations for the decline in child deaths may be the general improvement in medical sciences and greater accessibility to medical care. However, related socioeconomic factors such as education of the mother, economic status of the family and child care also seem to have improved among the Roman Catholics. Another moot question to be asked is: How much of the reduction in PID is due to the reduction in child mortality and how much is due to the reduction in the proportion of the child population?

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REFERENCES

1. Irudaya, R.S.: "Is there any demographic transition among Christians ?," *Indian Missiological Review*, 9(3): 228-41 (1987).

2. United Nations: *Principles for a Vital Statistics System. Statistical Office*, Statistical Paper Series M, No. 19, New York, 1953.
3. Irudaya, R.S.: "A Historical Demographic Study of Roman Catholic Population in the Archdiocese of Bombay", Ph.D. Thesis submitted to the University of Bombay, 1985.
4. Wrigley, E.A., and Schofield, R.S.: *The Population History of England, 1541-1871: A Reconstruction*, Edward Arnold Press, London, 1981.
5. Mari Bhat, P.N. and Irudaya, R.S.: "Changing patterns of medical care during delivery, and its impact on infant mortality in India". Paper presented at the National Seminar on Statistics in Medicine, Health and Nutrition, Hyderabad, 27-29 October, 1988.

MODERNISATION, STATUS OF WOMEN AND FERTILITY

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INTRODUCTION

Status literally means position in relation to others. The status enjoyed by women in any society is an index of the standard of its social organisation. Traditionally, while women perform the major roles of reproduction, managing the household and so on, in recent times, many new roles have been added on. The term 'status of women' then would denote not only a conjunction of the rights and duties but also the degree of her subordination in the home, education, economic status, role in decision making in family affairs, and her self-perceived status in the home and in the community.

In recent years, considerable attention has been focussed on the need for raising the status of women. This has been highlighted by the Chinese slogan 'break the thousand year old chains which have bound them by tradition and custom to an inferior role in society and reassure them that they too can hold up half of the heaven'. According to the United Nations[1], the status of women in society can be determined by her composite status which can be ascertained by the extent of control that she has over her own life derived from access to knowledge, economic resources and the degree of autonomy enjoyed in the process of decision making and choice at crucial points in her life cycle.

Speaking of the 'special interest' which women's status has for demographers, Blake[2] explains that "the nature of women's position and the variations in its articulation with the status of men, influence important variables with which students of population are concerned in particular, to reproductive behaviour and the size and the quality of labour force". Weller[3] found that wives manifest lower fertility behaviour in wife-dominant and egalitarian families rather than in husband-dominant families. Most researchers define the status of women as a multidimensional concept referring to women's access to and control over valued material and social resources, and/or to women's power and autonomy, that is, women's ability to control important events in their lives on their freedom from control by others, especially others in the family or household[4-9].

OBJECTIVES

The present study makes an attempt to examine the impact of moder-

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nisation on the status of women and fertility behaviour using two indices—one for modernisation and another for women's status.

SAMPLE AND METHODOLOGY

The study was conducted in Nellore town in Andhra Pradesh, The population of Nellore was 2.36 lakhs in 1981 and its decennial growth rate during 1971-81 was 76.8 per cent, the highest in Andhra Pradesh state. The literacy rate for males was 63.35 per cent and for females, 48.67 per cent which is high compared to all other towns in the S.V. University area, Tirupati.

The sample unit was the household having an eligible couple with one or more living children, and the wife not exceeding 44 years of age at the time of survey. The survey was largely confined to the husband, but the wife was also contacted for collecting information on certain items like pregnancy history and contraceptive practice. Thus, the couple as a unit was interviewed, which is an improvement in the methodology of fertility studies as most interview either males or females alone. The stratified, proportionate, simple random sampling design was used. The study area was stratified on the basis of municipal wards existing at the time of survey. Lists of households satisfying the above criteria were prepared ward-wise based on eligible couple registers, and a total of 600 households were randomly selected from these lists by applying weights to give a fair representation to each ward, the weight having the ratio of the number of households in a given ward to the total number of households in the universe.

Operational Concepts

Any given person may hold modern views on certain dimensions and traditional views on other dimensions of individual modernity. Hence, the modern and less modern were differentiated on the basis of the cumulative score of the respondents on selected dimensions of modernisation namely, faith in man's effort, openness to change. planning orientation, status of women, decision making and achievement[4]. The minimum score on these dimensions was 39 and the maximum score was 122. The respondents were divided into three groups based on their modernisation scores namely, less modern (39-71), intermediate (72-98) and modern (99-122), each representing approximately one-third of the total sample.

Status of woman index

In the present study, the status of women refers to the economic and social freedom enjoyed by the women in the family. An index was developed to measure the degree of status enjoyed by respondents within the family, based on the responses given by them to nine structured statements. The nine variables were: consulting the wife while making important decisions; discussing politics

with the wife; talking to the wife about birth control measures; having property or land in the wife's name; having a bank account in the wife's name; maintenance of the household account by the wife; keeping cash with the wife for daily expenditure; restrictions imposed on the daughter-in-law; and freedom available to the wife to argue with the husband in case of a difference of opinion.

All the statements had three alternative responses namely, 'No', 'Sometimes' and 'Yes' with scores 1, 2 and 3 respectively. The respondents were asked to indicate their opinions by choosing the appropriate response to each statement. Thus, the minimum score on the status of women was 9 and the maximum score was 27. The total score of a respondent on the status of women would be the sum of the scores for the responses given to each of the nine statements. On this basis, the respondents' wives were divided into the low (9-14), moderately low (15-16), moderately high (17-21), and high (22-27) categories depending on the status enjoyed by them in the family.

RESULTS AND DISCUSSION

The data presented in Table 1 show that a greater proportion - almost three-fourths or 75.2 per cent of the 'more modern' respondents accorded high status to their wives compared to their 'less modern' counterparts, none of whom accorded a high status to their womenfolk. Among the latter, 56.7 per cent of the respondents had given a low status score to their wives compared to none in the 'more modern' group. Nearly one-fourth (24.1%) of the 'more modern' respondents accorded a moderately high status to their wives as against only 12 per cent among the 'less modern' category. A negligible percentage (0.7%) of the wives of the 'more modern' respondents were accorded a moderately low status compared to nearly one-third (31.3%) in the 'less modern' category.

TABLE 1

Percent distribution of respondents by level of modernisation and status accorded to women

Level of modernisation	Status accorded to women			
	Low	Moderately low	Moderately high	High
Less modern	56.7	31.3	12.0	—
	(132)	(72)	—	28)
Intermediate	8.7	25.8	55.7	9.8
	(17)	(50)	(108)	(19)
More modern	—	0.7	24.1	75.2
	—	(1)	(42)	(131)

Figures in brackets indicate the number of respondents.

From the above findings it can be concluded that a greater proportion of the wives of the 'more modern' respondents enjoyed a high status in the family, whereas the majority of the 'less modern' respondents accorded a low or moderately low status to their wives.

The data in Table 2 show a linear inverse relationship between status of women and fertility for the total as well as younger and older females. A sharp decline in fertility was observed with increase in status enjoyed by the females (wives).

TABLE 2

Percent distribution by mean number of live births to women by status enjoyed by them in the family

Status enjoyed by women	Present age of wife (years)		Total
	≤ 29	30+	
Low	3.07 (55)	4.62 (94)	4.50 (149)
Moderately low	2.56 (48)	3.93 (75)	3.39 (123)
Moderately high	2.41 (75)	3.51 (103)	3.05 (178)
High	1.91 (54)	2.78 (96)	2.47 (150)

Figures in brackets indicate the number of respondents.

Table 2 clearly indicates that women who enjoyed a high status in the family had 2.03 fewer live births than their counterparts who enjoyed a low status (significant at .01 level). Further, those who enjoyed a moderately high and moderately low status, had an average of 3.05 and 3.39 live births respectively. A similar trend was observed among the younger and older age groups also. Younger wives (up to 29 years) who enjoyed a high status, had 1.16 fewer live births than their low status counterparts (significant at .01 level). Younger women who enjoyed a moderately low and moderately high status had an average of 2.56 and 2.41 live births respectively. Among the older age group, wives with high status had 1.84 fewer live births than their counterparts enjoying a low status (significant at .01 level), with an average of 3.51 and 3.93 live births among older wives of moderately high and moderately low status respectively.

The effect of the status of women on fertility behaviour cannot be assessed correctly when the different variables of status of women are examined together. Hence, multiple regression analysis was carried out to estimate the amount of variance in fertility behaviour explained by each of the selected dimensions of women's status.

The total variance in fertility as explained by five of the nine variables

considered for regression was 83.8 per cent for the 'less modern' and 'more modern' respondents as a whole. Talking to the wife about birth control measures emerged as a powerful predictor of fertility accounting for 26.7 per cent of the variance in fertility. Consulting the wife while making important decisions was the second important variable which explained as much as 21.4 per cent of the variance, while the third variable namely, discussing politics with the wife, accounted for another 14.4 per cent. Having property in the wife's name ranked fourth in order of importance, predicting 11.5 per cent of the variance in the fertility of the total respondents, while maintenance of household accounts by the wife explained 9.3 per cent of the variance in their fertility.

From these findings it can be concluded that fertility was significantly low among women who enjoyed a high status in the family.

SUMMARY AND IMPLICATIONS

The degree of status accorded to women in the family and society reflects the level of modernity of the people. In the present study, more than half (56.7 per cent) of the 'less modern' respondents accorded a low status to their wives and only 31.3 per cent gave a moderately low status to their womenfolk. This trend was reversed in the case of 'more modern' respondents. Three-fourths of the 'more modern' respondents accorded a high status to their wives and the rest accorded a moderately high status. Women who enjoyed a high status in the family had 2.03 fewer live births than their counterparts who were accorded a low status. In the younger and older age groups, wives with high status in the family had 1.16 and 1.84 fewer live births than their counterparts with low status.

In the light of the above evidence showing low fertility among women enjoying a high status in the family, there is a need to raise female status. This is possible through their greater involvement in more modern occupations which would provide them with greater economic freedom. This could be achieved by promoting higher levels of formal education and vocational education such as teacher training, nursing etc. The provision and effective implementation of reservations in educational institutions and work places for females as also giving them an equal right over property would raise their status and help in curtailing high fertility. Income generating schemes such as tailoring, carpet making, embroidery, poultry and dairy farming etc. should be promoted through vocational training and subsidised loans which would help women to earn money and to free themselves from economic dependence on male members, thereby enabling them to gain a high status in the family and society.

REFERENCES

1. United Nations: *Status of Women and Family Planning*, (C/CN-6/575/Ref. No. E/75/V5, 1975), New York, 1975.
2. Blake, Judith, "The changing status of women in developed countries", *The Scientific American*, 31(2): 137-147 (1974).
3. Weller, R.H.: "Role conflict and fertility", *Social and Economic Studies, Jamaica*, 18(3), 263-272 (1969).
4. Cain, M., Khanam, Syeda R. and Nahar, Shamsun: "Class, patriarchy and women's work in Bangladesh", *Population and Development Review*, 5(3) : 405-438 (1979).
5. Safilios--Rothschild, C. "Female power autonomy and demographic change in the third world", In *Interactions between women's Roles and Population Trends in the Third World*, R. Anker et al., (eds) London, 117-132, 1982.
6. Safilios-Rothschild, C.: "A class and sex stratification and its relevance for fertility trends in the developing world", In *Determinants of Fertility Trends : Theories Re-examined*, C. (Eds.) Liege, Belgium Ordina Editions, Liege, 1982.
7. Dyson, T. and More, M. : "On kinship structure, female antonomy and demographic behaviour in India", *Population and Development Review*, 9 (1) 35-60 (1983).
8. Mason, K.O.: "The status of women, fertility and mortality : A review of interrelationships". Paper prepared for the Population Sciences Division, The Rockfeller Foundation, New York, 1983.
9. Blumberg, R.L. : "A general theory of gender stratification". In *Sociological Theory*, Randall Collins (ed.) London, pp. 23-101, 1984

A STUDY ON BIASES IN AGE REPORTING

MS. MINI N. PANICKER*

INTRODUCTION

Age misreporting is a common feature in many societies particularly in developing countries. Usually two types of biases distort age distribution—age heaping and tendentious bias. The tendency of respondents to report certain ages at the expense of others results in age heaping, while the tendency to avoid or prefer certain ages like the age of retirement, age at maturity etc. is known as tendentious bias.

Age mis-statement can also happen due to many other reasons such as the ignorance of age, unwillingness on the part of the respondents to divulge the exact age, deliberate mis-statement[1], poor knowledge about the definition of age[2], memory lapse, ignorance of the ages of other members of the household[3], and preference for certain terminal digits[4]. In certain cases, misjudgment by interviewers and poor interview procedures are possible sources of error[5].

Digit preferences are influenced by socio-cultural factors. For example, the then Punjab Superintendent of Census had reported in 1911 about the belief that telling one's correct age may reduce his or her span of life (in the Niti Shastra, it was laid down that man's age was one of the nine details that he must hide)[6]. Such beliefs could also lead to willful misreporting of age. The main reason for age distortion in many surveys is the respondent's ignorance of the exact ages and dates of birth of other members of the household. And, the most important point however is that in surveys, the reporting of ages of the members of a household is done by a responsible member of that household. Therefore, the level of education of the respondent, the place of residence of the household etc., can have some influence on the quality of age reporting[7]. Characteristics such as sex, education and religion of the respondents can also have differential effects on the quality of age data.

OBJECTIVES

The present paper is an attempt to examine the extent of bias in the age distributions of the population with respect to the characteristics of the respondents. If the biases are found to be related to the characteristics of the respondent, then it will be possible to suggest as to who should be the respondent so as to reduce the possible error.

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DATA AND METHODOLOGY

The data for this study are taken from the Kerala Fertility Survey[7] conducted in 1980. This survey was organised by the World Bank in collaboration with the Kerala State Bureau of Economics and Statistics in three districts of Kerala namely Alleppey, Ernakulam and Palghat. The sample covered 3063 households which had a total of 17,937 people with 8734 males and 9203 females.

The information collected as related to this study pertains to age in single years and sex of each member of the household as reported by the respondent. The advantage in selecting these data is that the survey identifies the respondent and hence it is possible to prepare the age-sex distribution based on the characteristics of the respondent. Information on the age, religion and education of the respondents were also available.

The age-sex distribution of the total population and that of the respondents with respect to their characteristics were analysed for the various biases. The measures used for studying the biases in age heaping were Whipple's index, Myers' index[1] and Ramakumar's index[8]. A brief overview of these methods is made here.

Whipple's index[1] measures the heaping at ages ending in digits '0' and '5'. This index is obtained by summing the age returns between 23 and 62 years inclusive and finding what percentage is borne by the sum of the returns of years ending with '0' and '5' to one-fifth of the total sum. It would vary between a minimum of 100 and a maximum of 500, and is an effective measure of age accuracy so far as digit preference is concerned.

For Myer's index[1], a "blended" population is computed first. The "blended" totals for each of the ten digits should be very nearly 10 per cent of their grand total. The deviations of each sum from 10 per cent of the grand total are added together, irrespective of whether they are positive or negative. Their sum is Myer's index which can vary from 0 to 180.

Tendentious bias in the age distribution is measured by the United Nations index. It considers age groups from 0-4 to 65-69 (14 intervals). The sex ratio at each age group is calculated and successive absolute differences are added and averaged. The male and female age ratios are calculated separately and the absolute deviations from unity are added. Thus, the average male and female age ratio scores are calculated. Three times the average of the sex ratio differences is added to the average of the male and female age ratio scores to estimate the United Nations Index[1] There is no theoretical minimum or maximum value for this index.

Ramakumar has made an attempt to modify the United Nations index. This modified index[7] measures the differentials in reporting by sex in the reported age distributions. Ramakumar's index is defined as $\frac{1}{n}\ |SRo\text{-}SRc|$

where 'SRo' is the observed sex ratio and 'SRc' is the corrected sex-ratio, the summation extending over all the 'n' age intervals considered for the index.

The quality of the data on age distribution and the nature of bias in each case was studied by using these four measures for various age groups.

RESULTS AND DISCUSSION

The indices of age accuracy for the total population, total respondents and for persons whose ages were reported by male and female respondents in the survey are given in Table 1.

TABLE 1

Indices of age accuracy for the total population, total respondents and persons whose ages were reported by male and female respondents

	Whipple's Index			Myers' Index			United Nations Index	Ramakumar's Index
	M	F	T	M	F	T		
Total population	141.13	145.32	143.34	20.46	19.68	20.05	33.63	0.07
Total respondents	122.14	137.62	130.45	17.23	18.46	18.01	52.51	0.1352
Male respondents	126.20	143.26	136.71	15.71	19.41	16.96	58.55	0.2315
Female respondents	152.74	148.09	150.18	24.35	21.32	22.72	48.28	0.12

M = Male; F = Female, T = All or total respondents.

It is evident from Table 1 that there exists a preference at different digits 0, 1, 2, ...9. The digit preference '0' and '5' for the age distribution of males was observed to be less than that of females for the total population (Whipple's index 141.13 for males and 145.32 for females). Myers' indices confirmed the extensive heaping at each digit for both exes and in all populations, although there was a slightly greater heaping for the male age distribution than that for females. The heaping appeared to be reduced in the respondents' age distribution, suggesting that the respondents' were able to report their own ages better than the ages of other members of the household. When male-female differences were taken into consideration, the heaping appeared generally less in the age distribution of male respondents than that of female respondents. Male respondents reporting the ages of males and females showed less bias in digit preference compared to that of the total popula-

tion. When the respondents were female, the Whipple's and Myers' indices were high. On the other hand, female respondents showed greater preference were at all digits. In other words, female respondents played an important role in the distortion of the age distribution of the total population. An interesting point to be noted is that the bias appeared to be low if the reporting of ages was done by respondents of the same sex.

The tendentious bias was found to be high for the total population as well as for subgroups. The United Nations index confirmed that the bias is greater for the age distribution reported by males compared to that of females, total respondents and the total population. The same situation was seen in the differentials in the reporting of sex as per Ramakumar's index. Though the age distribution reported by males showed a higher sex difference in age reporting, the tendentious bias did not appear to be much different among the reported distributions of females and the total population (Ramakumar's index for male respondents : 0.2315). The tendentious bias was high for the respondents' distribution also. Ramakumar's index showed low sex difference in age reporting for the total population as well as total respondents. The tendentious bias among female respondents was lower than that among males in this sample. The higher number of females compared to males may be one of the reasons for the comparatively lesser tendentious bias and the very low sex difference in age reporting in the total population.

Age

The respondents were classified into two groups according to their age. Those aged less than 40 constituted one group and the other group included

TABLE 2

Indices of age accuracy according to the respondent's age

	<40 years	40 or 40+ years
Whipple's Index		
Male	133.09	135.43
Female	148.61	148.11
Total	144.06	142.66
Myers' Index		
Male	21.91	15.55
Female	24.04	20.95
Total	22.80	18.67
United Nations Index		
Male	114.81	97.05
Female	117.99	107.44
Total	91.56	83.64
Ramakumar's Index		
Male	1.78	0.37
Female	2.77	1.06
Total	0.94	0.45

those aged 40 years and above. The indices of age accuracy according to the respondent's age are given in Table 2.

It is clear from Table 2 that respondents aged 40 years and above reported ages better than the younger respondents. The preference for all digits in both groups was evident from the values of Whipple's and Myers' indices. Females showed a greater tendency to prefer certain digits. The high values of Whipple's and Myers' indices in the total of both groups may be the result of the strong biases in female age distribution. Even though the tendentious bias was very high in both groups, it was relatively lower among respondents below 40 years of age. It was most pronounced in the case of female respondents. The preferences for ages were not identical among males and females. The high sex difference in age reporting among the younger respondents resulted in high values of Ramakumar's indices. In short, the age reporting of males aged 40 and above can be considered as the best classification. Otherwise, the bias was relatively low, when the ages were reported by elder males.

Education

The respondents were classified into literates and illiterates with a view to finding out whether the educational level of the respondent had any effect on age reporting. The indices were calculated to examine biases in the age distribution of the population with respect to the educational attainment of the respondents. The values are given in Table 3.

TABLE 3

Indices of age-accuracy for persons whose age were reported by literate and illiterate respondents

Respondent's educational level	Illiterate	Literate
Whipple's Index		
Male	145.50	132.22
Female	142.51	146.34
Total	143.95	139.42
Myers' Index		
Male	23.32	18.62
Female	21.49	19.67
Total	21.43	19.22
United Nations Index	263.22	72.70
Ramakumar's Index	2.29	0.2515

As expected, digit preference was found to be high among illiterates com-

pared to literates. The male age distribution showed less bias than female age distribution among literates, while the latter was less biased than the former among illiterates.

The tendentious bias was found to be very high among illiterates. Again, the tendency to report certain ages in preference to others did not appear to be the same for males and females, resulting in a high value for Ramakumar's index particularly for illiterates. On the whole, age reporting by literate respondents was comparatively better than that by illiterate respondents. Thus it can be concluded that literate males showed lesser evidence of digit preference.

Religion

The age-sex distribution of the total population and that of the respondents was classified according to their religion in order to examine whether there was any quality difference among the groups. The age accuracy indices for Hindus, Muslims, Christians and their corresponding respondents' age distributions are given in Table 4.

TABLE 4

Indices of age accuracy for the total population and total respondents characterised according to their religion

	Whipple's Index			Myers' Index			United Nations Index	Ramakumar's Index
	M	F	T	M	F	T		
Hindus	139.64	137.76	138.64	20.17	18.34	19.26	37.92	0.1485
Hindu respondents	118.56	128.41	124.28	18.16	23.48	20.72	60.74	0.189
Muslims	147.59	170.45	159.66	28.11	26.58	27.24	89.34	0.3685
Muslim respondents	112.45	146.48	138.53	35.68	29.53	30.12	115.37	5.62
Christians	142.04	154.22	148.30	18.24	23.98	18.82	76.50	0.44
Christians respondents	115.62	153.36	140.29	23.98	30.47	26.45	103.26	0.98

M = Male; F = Female, T = All or total respondents.

The age distribution of Hindus showed less preference at '0' and '5' digits and that of Muslims showed greater preference for those digits. The heaping was greater for Hindu males while it was less among Christian and Muslim males than their corresponding female counterparts. The respondents' age distribution showed less bias than their corresponding total population among

all the three religions. When male-female differences were considered, the distribution of males showed lesser bias than that of female respondents. As far as the respondents' religion was considered, Hindus were less likely to report ages on preferred digits than Muslims and Christians. The age distribution of males was less distorted among Hindus and Christians. On the whole, the reporting of ages by females was responsible for the bias in the age distribution of the total population.

When the age distribution of Hindus, Muslims and Christians and their corresponding respondents' age distributions were compared, the tendency to avoid ages was less pronounced among Hindus. It was also found that the tendentious bias was less for Hindu respondents (United Nations index 60.74) compared to the values of United Nations index for Muslims (115.37) and Christians (103.26). It was also less pronounced (United Nations index 37.92) among Hindus and did not appear much different among men and women (Ramakumar's index 0.1485). However, among Christians and Muslims, tendentious biases were high and very much different between the two sexes. On comparing the three religious groups, digit preference and tendentious biases were observed to be very high for the Muslim age distribution. A higher sex difference in age reporting was seen among the Muslim respondents (Ramakumar's index 5.62) while it was comparatively low among the Christian and Hindu respondents (Ramakumar's index 0.98 and 0.189 respectively). In short, Muslims appeared to play a crucial role in the distortion of the age distribution of the total population.

CONCLUSION

Female respondents showed a greater preference at all digits, though their tendentious bias was lower than that of male respondents. That female respondents outnumbered males was one of the reasons for the comparatively lesser tendentious bias and the very low sex difference in age reporting in the total population.

The degree of age misreporting was noticeably reduced when the respondents were elder males. Probably the greater exposure of elder respondents to matters concerning the family gives them a better sense of the age of the members of their households. The reporting of ages by literate respondents also minimised errors indicating that the level of education has an important role in the accurate reporting of age. Further, the bias appeared to be low if the reporting of ages was done by respondents of the same sex. If age distribution according to the respondent's religions was considered, then the bias was reduced for Hindu respondents.

The study also suggests that the selection of a respondent in household surveys has to be done with greater care not only to reduce errors in the reporting of age but of other important characteristics as well; in the case

of age, documentary evidence may be called for wherever available, to verify the veracity of the reports.

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REFERENCES

1. United Nations: "Methods of Appraisal of Quality of Basic Data for Population Estimates". *Manuals on Methods of Estimating Population*. Manual II. Series A. Population Studies. No. 23. 1955.
2. Singh, Susheela: "Evaluation of the Jamaica Fertility Survey 1975-76". *World Fertility Survey*. Scientific Reports No. 34. 1982.
3. Rizgalla. M.: "Evaluation of the Sudan Fertility Survey 1978-79". *World Fertility Survey*. Scientific Reports No. 72. 1985.
4. Santow. Gigi and Bioumla. A.: "An Evaluation of the Cameroon Fertility Survey 1978". *World Fertility Survey*. Scientific Reports No. 64. 1984.
5. Uner. S.: "Evaluation of the Turkish Fertility Survey 1978". *World Fertility Survey*. Scientific Reports No. 43. 1983.
6. Saxena, P.C., Verma, R.K. and Sharma, A.K.: "Errors in age reporting in India: A socio-cultural and psychological explanation". *The Indian Journal of Social Work*. XLVII(2) : 127-135 (1986).
7. Zachariah, K.C.: "The Anomaly of the Fertility Decline in India's Kerala State: A Field Investigation", *World Bank Staff Working Papers*. No. 700. 1981.
8. Ramakumar. R.: *Technical Demography*. Wiley Eastern Limited. New Delhi. 1986.
9. Panicker. Mini. N: "Age Reporting Biases in Palghat District". M.Sc. Dissertation (unpublished). University of Kerala. 1988.

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CONTENTS

FOREWORD

The provisional results of the 1991 Census place India's population at 843.9 million as of 1st March this year. This figure, which for the first time, agrees to a remarkable extent with the projections made by population experts, has once again brought into sharp focus the nature and magnitude of the population issues facing the country. For, despite a marginal decline, the growth rate continues to remain above two per cent, and apart from literacy which has improved substantially among both males and females, there seems to be little scope for optimism.

This special issue on the 1991 Census basically brings together nine articles presented at a symposium on "The findings and implications of the 1991 Census" organised by the International Institute for Population Sciences, Bombay, on 16th April 1991. There is also an article by Dr. P.N.Kapoor, Joint Director, Department of Family Welfare, Ministry of Health and Family Welfare. The authors are well-known for their contribution to various disciplines of Indian demography, and the volume as such, provides a good insight into the demographic and socioeconomic trends during the 1981-91 decade.

It may be mentioned that in 1981, *The Journal of Family Welfare* had published a similar Census number on the issues highlighted by the provisional totals of the 1981 Census.

This special Census number begins with an article by Dr. K. Srinivasan, Director, International Institute for Population Sciences, on the general demographic scene as revealed by the 1991 population totals. Following this, are nine articles which analyse different aspects of population change such as growth patterns, trends in the sex ratio, socioeconomic development and literacy, migration levels, and urbanisation. The articles provide a fairly good picture of the current demographic scene in the country, the past trends and possible future implications, though a clearer picture would be forthcoming only after population age-sex distributions become available. I thank the authors for their scholarly contributions and specially thank Dr. Srinivasan and Prof. Tara Kanitkar for their co-operation in bringing out this volume.

Avabai B. Wadia
Editor

PREFACE

The twelfth decennial population census and the last one of this century in India, was conducted from 28 February to 5 March 1991. Counting about 850 million people within a short span of two weeks is a gigantic task requiring a vast network, and organisational, managerial and technical skills. The Registrar General and Census Commissioner of India did the job with the splendid skill and efficiency that has characterised the census operations in this country. The provisional population totals and information on selected characteristics of the population at district and state levels were released on 26 March 1991, within three weeks of census-taking, a laudable achievement of the census office.

From the preliminary results published, in Paper-1 of the census series "Provisional Population Totals" for the country as a whole and for different states, in March-April 1991, it was possible to get a picture of the nature of demographic and socioeconomic trends in India during the last decade. The International Institute for Population Sciences, Bombay organised on 16 April 1991, a one-day symposium on the "Findings and Implications of the 1991 Census" in order to exchange views and discuss the implication of the preliminary census results. Nine papers were presented by scholars looking at the population figures from the perspective of different disciplines, expressing their views on various aspects of Indian society in terms of demographic and socioeconomic trends during the past decade as obtained from the provisional census totals. Dr. V. Ramalingaswamy, Professor Emeritus at the All India Institute of Medical Sciences, Delhi and former Director General of the Indian Council of Medical Research, was a special invitee to the symposium and chaired the sessions.

The symposium was well attended with many distinguished persons from Bombay actively participating in the discussions. Prof. Tara Kanitkar, Professor and Head, Department of Development Studies, coordinated this symposium. The Family Planning Association of India, under the stewardship of its President, Mrs. Avabai B. Wadia, kindly agreed to publish the papers presented at the symposium in their journal, *The Journal of Family Welfare,* as a special volume. Mrs. Jyoti Moodbidri, Managing Editor of the Journal, assisted in editing and publication. In this connection, it is worth recording that a similar publication was brought out by the Family Planning Association of India soon after the 1981 census results were released.

I thank the Family Planning Association of India and its President, Mrs. Avabai B. Wadia in particular, for their interest in devoting a special volume of *The Journal of Family Welfare,* to the findings and implications of the 1991 census. I also thank Prof. Tara Kanitkar and other colleagues at the Institute, who have taken pains to prepare the papers though hurriedly on the basis of the provisional totals of the 1991 census. To have a clearer

picture of the dynamics of fertility and mortality and population change in the country, it is necessary to await data on age-sex distribution of the population, which may be forthcoming only next year. However, even from an analysis of the provisional population totals presented in this volume, it is evident that the population problems of the country continue to daunt us and it is high time that policy makers and planners do take appropriate remedial measures.

Prof. K. Srinivasan
Director
International Institute for
Population Sciences, Bombay

THE DEMOGRAPHIC SCENARIO REVEALED BY THE 1991 CENSUS FIGURES

DR. K. SRINIVASAN*

India can take legitimate pride in the fact that it has an unbroken series of decennial censuses commencing from 1881. The twelfth in this series, and the last one of this century, has been completed recently with the counting carried out from 28 February to 5 March 1991. With the speed and efficiency that has characterised the census operations, the provisional totals and information on a few characteristics of the population were released on 26 March within three weeks of census-taking. The Registrar General and Census Commissioner deserve our congratulations on such a mammoth task efficiently discharged.

The population of the country as of first March this year is placed at 843.9 million. For the first time the projections for 1991 made by population experts have agreed to a remarkable extent with the census total. For example, the Standing Committee of Experts on Population Projections, appointed by the Planning Commission, which published its figures in October 1989, projected India's population as of 1 March 1991 at 843.6 million, hardly 0.3 million less (or less than 4 per 10,000 persons), which is a remarkable achievement for the second largest country in the world. Similarly, the International Institute for Population Sciences, Bombay, which has been responsible for the development and display of the Population Clock every day on Doordarshan estimated it at 847.0 million (telecast on that day), which is also remarkably close to the provisional census total. The demographers and population specialists seem to have hit the bull's eye in predicting the population; we can indeed be proud of our skills in population projection.

The socio-economic picture that emerges for the country as depicted by the 1991 census figures, however, is far from optimistic and definitely frustrating in some aspects. During the decade 1981-91, India has added a whopping 160.7 million to its population, which is almost equal to the combined population of France, the United Kingdom and Italy. During the decade, the population increased by 23.50 per cent or at an annual rate of 2.11 per cent, compared to 24.66 per cent or an annual rate of 2.22 per cent in the 1971-81 decade. Though the growth rate shows a small decline during 1981-91 compared to earlier years when it was steadily rising, the decline has been very slow and even by 1990, the barrier of 2 per cent growth in the

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population for the country as a whole, does not seem to have been overcome.

The picture, however, seems to be different when we consider the figures separately by state. Kerala, Tamil Nadu and Goa have registered a decadal growth rate of 13.98, 14.94 and 15.96 per cent respectively—far lower than the national level of 23.50. They are also the states which have recorded a substantial decline in their growth rates compared to the earlier decade. On the other hand, among the large Hindi-speaking states of Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan (which have been euphemistically referred to as "Bimaru" states), the growth rates continue to remain quite high, with decadal increases of 25.16, 23.49, 26.75 and 28.07 per cent respectively. These states together constitute almost 40 per cent of India's population, and the prevalence of a high rate of growth in such a vast area would largely determine the national scene. The demographic differences between the states are accentuating over time and at present, the large Hindi-speaking states are lagging behind by 15 to 20 years in regard to many demographic parameters. Demographic polarisation of states into two groups is likely to have political and other repercussions.

Another cause for serious concern is the sex ratio of the population. The results of the 1981 census were welcomed by those who were interested in improving the status of women since it indicated for the first time a reversal in the trend of declining sex ratio since the beginning of the century. The sex ratio declined almost steadily from 972 in 1901 to 920 in 1971, but in 1981 this declining trend was arrested and marginally increased to 934 females per 1000 males. Credit was given to the special emphasis given by the Government to the provision of maternal and child health care services, improvement in female literacy, legal measures to control atrocities on women such as dowry deaths, and the emergence of a strong leadership group among women. However, the 1991 census seems to have, at first sight, shattered this hope, with the sex ratio declining once again to 929 females per 1000 males.

In many states, especially the large Hindi-speaking ones, the sex ratio seems to have declined substantially. For example, in Uttar Pradesh, from 885 in 1981 to 882 in 1991, and in Bihar from 946 to 912. Surprisingly, even Maharashtra, which is considered as one of the most progressive states in the country, has recorded a sex ratio of 936 in 1991 compared to 937 in 1981. Only in Kerala, the population has favoured females with 1040 females per 1000 males, followed by Himachal Pradesh with 996.

Preliminary analyses carried out with available census data indicate the possibility of a relatively higher degree of under- enumeration of females—to the extent of 5 to 6 million. Some findings supporting the under-enumeration of women in the 1991 census are given below.

Statewise estimates of mortality for the period 1981-91, available yearly from the SRS upto 1989, reveal that the life expectancy of females in most states, including Uttar Pradesh and Madhya Pradesh, has been rising more rapidly than that for males during the decade. Other indicators of mortality available from various sample surveys conducted in several states also reveal substantial improvements in the infant and child mortality levels of girl children, reductions in maternal mortality, and in the overall adult female mortality. The expectation of life at birth of females has been computed to be higher than that of males in almost all the states during the decade 1981-91. Demographically, in a situation where the expectation of life of females is rising faster than that of males, the sex ratio of the population (defined as number of females to 1000 males) has to increase; this is contrary to the findings of the 1991 census.

Regression analysis relating the sex ratio of the population with female literacy levels also reveals some interesting findings. For the country

TABLE 1

Zero order correlation coefficient (r) between the sex ratio and female literacy rate, 1991

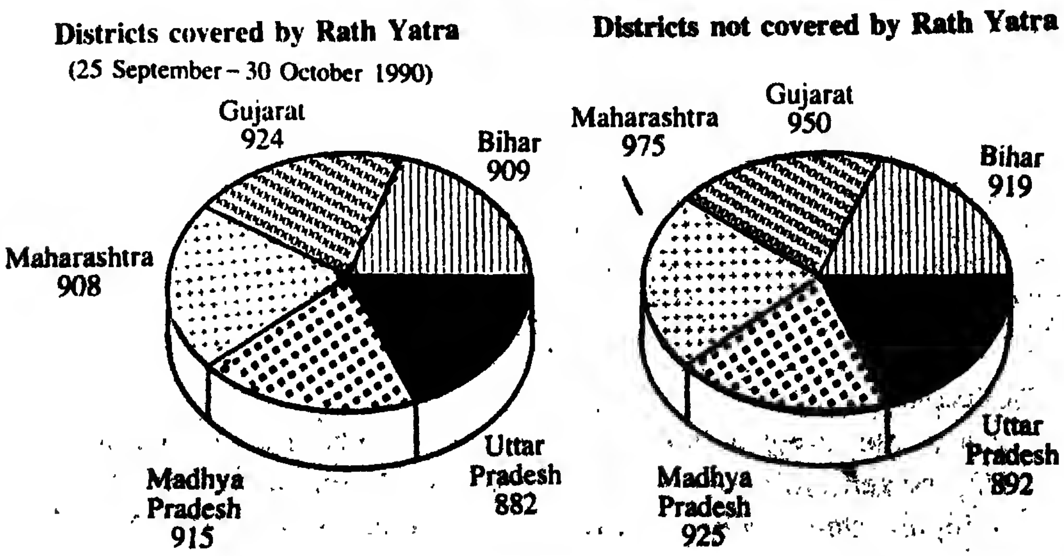
Area	Unit of analysis	Number of Units (N)	r (correlation between sex ratio and female literacy)
All India	States(large)	15	0.6235*
Andhra Pradesh	District	23	−0.3641
Bihar	District	42	−0.1797
Gujarat	District	19	−0.4037
Haryana	District	16	0.1769
Himachal Pradesh	District	12	0.7442*
Karnataka	District	20	0.2210
Kerala	District	14	0.1985
Madhya Pradesh	District	45	−0.0274
Maharashtra	District	30	0.0358
Orissa	District	13	−0.7605*
Punjab	District	12	0.2593
Rajasthan	District	27	−0.1426
Tamil Nadu	District	21	0.0829
Uttar Pradesh	District	64	0.1818
West Bengal	District	17	−0.7634*

* Significant.

as a whole, using only the major states as units of analysis (numbering 15), the zero order correlation coefficient is found to be +0.6235 which is highly statistically significant (see Table 1). One should logically

expect such a significant positive correlation between the sex ratio and the female literacy level in a country as large as India, since everywhere in the world, improvements in female literacy are associated with a higher status of women, better maternal and child care, lower infant and child mortality, and a reduction in the level of discrimination against women. This is currently occurring in India. On the other hand, when the relationship between the sex ratio and female literacy rate within each state is analysed, using the district as the unit of analysis, negative correlations are observed in the states of Andhra Pradesh, Bihar, Gujarat, Madhya Pradesh, Rajasthan, Orissa and West Bengal (Table 1). Such negative correlations are extremely unlikely in such large states and are indicative of omissions, to a relatively higher extent, of females in the census enumeration. Except for West Bengal and Orissa, the other states experienced enormous social unrest, communal tension and violence for over six months prior to census-taking. Under such circumstances, there is a likelihood of gross under-reporting of females in the population. The quality of data obtained in the census has been influenced to a considerable degree by the political and social climate that prevailed in the country during or immediately preceding the enumeration. The large-scale social and communal conflicts that were generally widespread in the Hindi-speaking states following the Ratha Yatra (procession of Hindu fundamentalists) and the issues relating to the construction of a temple in Ayodhya (in Uttar Pradesh), and the implementation of the Mandal Commission report which recommended the reservation of jobs for backward communities, might have contributed to an under-reporting of females, especially of unmarried girls in the age groups 15-19, 20-24 and 25-29, in households in rural areas of these states (out of fear).

Figure 1
Average Sex Ratio



To check on this point on an empirical basis, we computed the sex ratios of different districts in the disturbed states, and classified them into two groups viz., those through which the Rath Yatra marched during September-October 1991 and the other districts. In the former districts, the sex ratio was lower than that in the latter, as given in Table 2, indicating that the communal disturbances preceding the census might have contributed to a higher degree of under-enumeration of females than males in these areas (Figure 1).

TABLE 2

Sex ratios in more and less disturbed areas

Area	Sex ratio		
	Districts covered by Ratha Yatra*	Districts not covered by the Ratha Yatra*	Combined
Bihar	909	919	912
Gujarat	924	950	936
Madhya Pradesh	915	925	932
Maharashtra	908	975	936
Uttar Pradesh	894	892	882

* Between September and October 30, 1990

4. Based on available data on age-sex specific mortality rates, upto 1988, the Standing Committee of Experts on Population Projections estimated the sex ratio in 1991 as 942 females per 1000 males. If we take this figure to be close to the actual situation, the under-enumeration of females (relative to males) works out to 5.7 million.

The most frustrating implication of the 1991 census is the poor impact of the national family planning programme in reducing the fertility level and arresting the population growth rate. There appears to be a very poor correlation between the growth rates and the couple protection rates estimated by the Ministry of Health and Family Welfare. India was the first country to launch an official programme of family planning as early as 1952, and during 1951-87, almost Rs. 3500 crores have been spent on the programme. The current pace of annual expenditure is estimated at Rs. 600 crores per year or Rs. 44 per eligible couple per year. In spite of the fact that there has been a substantial increase in expenditure since 1976, the birth rate has been hovering between 30-33 births per 1000 population per year during this period. The diminishing returns on investments made in the family planning programme are largely a result of the emphasis on sterilisation which attracts older couples (with the wife aged 30 years and above) after they have achieved their desired family size. There is a need to revamp the family planning

programme to make it acceptable to younger age and lower parity couples by encouraging the use of spacing methods.

One silver lining in the rather dark and gloomy picture revealed by the 1991 census is that the literacy rates of the population aged 7 and above have substantially increased during the past decade. The literacy rate has increased from 43.6 per cent in 1981 to 52.1 per cent in 1991. Among males, the increase is from 56.4 per cent to 63.9 per cent and among females from 29.8 per cent to 39.4 per cent. Though this quantum of increase among females may not be considered as substantial by some sociologists, it has to be recognised that an increase of almost 10 percentage points in a vast country like India is no mean achievement. While the literacy rate has increased, the absolute number of illiterates in the country (among those aged 7 and above) has continued to increase—from 301.93 million in 1981 to 324.03 million in 1991, an increase of 22.10 million of which 5.79 million are males and 16.31 million are females. India continues to be the country with the largest illiterate population in the world. Again, a divergent picture emerges when the states are analysed separately. Kerala has the highest literacy rate of 90.6 per cent among the population aged 7 plus, with 94.3 per cent among males and 86.9 per cent among females. The southern states (except Andhra Pradesh), Maharashtra, Goa, Mizoram, Delhi, Chandigarh and most of the north-eastern states, have significantly higher literacy rates (over 60%). Again, the states of Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar have literacy rates lower than the national average, both for males and females. For example, Bihar and Rajasthan have the lowest female literacy rates with only 23 and 20 per cent of females aged 7 and above being able to read and write. We cannot over-emphasise programmes for improvement of female literacy in these states.

The growth rates of metropolitan cities have revealed some surprising trends. The population of Greater Bombay has increased from 8.24 million in 1981 to 9.91 million in 1991 registering an annual rate of growth of 1.84 per cent compared to 3.25 per cent experienced in the previous decade, 1971-81. This dramatic decline in the growth rate of Greater Bombay during the last decade can be largely attributed to the development of various urban agglomerations around Bombay city such as, Vashi, Panvel, Neral and Kalyan (which are in neighbouring districts of Thane and Raigad), into which a large number of Bombay residents have moved. There appears to be a substantial dispersion of Bombay's population into New Bombay, a laudable achievement of the Maharashtra Government in reducing the pressure of population in Greater Bombay. Among other cities, Hyderabad has recorded a maximum rate of growth, with its population increasing from 2.50 million in 1981 to 4.27 million in 1991, at an annual rate of growth of 5.35 per cent per year. This is followed by Delhi which has increased its population from 5.70 million

in 1981 to 8.38 million in 1991, recording an annual growth rate of 3.85 per cent. Similarly, Bangalore city has also grown substantially with an annual growth rate of 3.54 per cent per year during the decade 1981-91. These cities can benefit from the experiences of Bombay which has been successful in developing residential towns on the outskirts of the metropolitan city.

India cannot afford its present rate of population growth of 2 per cent per year without inviting the Malthusian checks of famine, epidemics and conflicts to control its population. Not only are economic imbalances within the states aggravated by the continuing growth of population, but imbalances between states are polarising them demographically as more advanced and less advanced states, leading to an increase in political tension. There is an urgent need to implement innovative and imaginative programmes to reduce fertility levels as quickly as possible, otherwise mortality levels can be expected to rise and so will political tension, conflicts and violence, with a larger population scrambling for limited resources.

IMPLICATIONS OF THE PROVISIONAL RESULTS OF THE CENSUS OF INDIA, 1991

DR. P.N. KAPOOR*

INTRODUCTION

According to the provisional results of the 1991 census of India which were declared in the last week of March 1991, the population of the country stood at 843.93 million. The population was up by 160.6 million over the 1981 census, implying a decadal growth rate of 23.5 per cent. The total population of the country was almost the same as 843.6 million, projected by the Standing Committee of Experts on Population Projections in 1989.

Table 1 indicates that the average exponential growth rate of the population was only 1.25 during 1941-51; but it registered a sharp increase to 1.96 in the subsequent decade, 1951-61, and increased further to 2.20 during 1961-71 and 2.22 in 1971-81. The growth rate having reached a plateau during 1971-81 has now declined to 2.11 during 1981-91. This decline, though marginal, is significant as it is likely to herald a faster decline in the coming decades.

TABLE 1

Population and growth rates, 1951-91

Year	Population Millions)	Increase over previous year		Exponential growth rate
		Absolute no.	Percent	
1951	361.09	(+) 42.42	(+)13.31	1.25
1961	439.23	(+) 77.68	(+)21.51	1.96
1971	548.16	(+)108.92	(+)24.80	2.20
1981	683.33	(+)135.17	(+)24.66	2.22
1991	843.93	(+)160.60	(+)23.50	2.11

This note reviews the growth rates for the major states, excluding Assam where the census was not undertaken in 1981 and Jammu and Kashmir where it is yet to be taken up in the 1991 round. The analysis covers all the remaining fifteen major states which together account for 94 per cent of the country's population.

Amongst the major states, the population, as of the 1991 census, varies from 5.1 million in Himachal Pradesh to 138.8 million in Uttar Pradesh.

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Other states reporting over 60 million population are Bihar, Maharashtra, West Bengal, Andhra Pradesh and Madhya Pradesh.

A review of the exponential growth rates recorded in 1981-91 shows that three states—Haryana, Madhya Pradesh and Rajasthan—recorded growth rates higher than 2.3 per cent whereas seven states recorded growth rates lower than 1.9 per cent—Gujarat, Himachal Pradesh, Karnataka, Kerala, Orissa, Punjab and Tamil Nadu (Table 2). The highest growth rate of 2.47 per cent was recorded by Rajasthan and the lowest of 1.31 per cent was recorded by Kerala.

TABLE 2

Annual exponential growth rates, 1941-1991

State	1941-51	1951-61	1961-71	1971-81	1981-91
Andhra Pradesh	1.31	1.45	1.88	2.10	2.14
Bihar	0.98	1.80	1.92	2.17	2.11
Gujarat	1.71	2.38	2.56	2.46	1.89
Haryana	0.73	2.91	2.77	2.55	2.33
Himachal Pradesh	0.53	1.64	2.06	2.15	1.77
Karnataka	1.77	1.95	2.15	2.39	1.88
Kerala	2.06	2.21	2.31	1.77	1.31
Madhya Pradesh	0.83	2.16	2.50	2.27	2.37
Maharashtra	1.76	2.12	2.41	2.21	2.26
Orissa	0.62	1.81	2.22	1.85	1.78
Punjab	(−) 0.45	1.95	1.95	2.16	1.85
Rajasthan	1.41	2.33	2.44	2.87	2.47
Tamil Nadu	1.37	1.12	2.00	1.63	1.39
Uttar Pradesh	1.12	1.54	1.79	2.29	2.24
West Bengal	1.24	2.84	2.36	2.10	2.20
India	1.25	1.96	2.20	2.22	2.11

A comparison of the growth rates of different states for 1981-91 and 1971-81 shows that the growth rate declined in eleven states but increased in four states—Andhra Pradesh, Madhya Pradesh, Maharashtra and West Bengal. The states which recorded a decline constitute 61 per cent of the country's population; this augurs well for a continuing declining trend in population growth during the coming decades.

The increase in the growth rate in Andhra Pradesh, Madhya Pradesh, Maharashtra and West Bengal requires deeper analysis after the estimates of the pattern of inter-state migration and birth and death rates become available. The increase in the growth rate could be on account of a combination of different factors such as an increase is net in-migration, a slow decline or stagnation of the birth rate, and a comparatively faster decline in the death rate.

A review of the estimates of the growth rate for the last 50 years from

1941 to 1991 shows that out of the fifteen major states, fourteen have already attained peak growth rates in the past. The only exception is Andhra Pradesh where the growth rate has consistently increased right upto 1981-91. During 1951-61 only two states attained peak growth rates, while six attained their peak during 1961-71, and the remaining during 1971-81 as may be seen from the following table

Decade	*States recording peak growth rates*
1951-61	Haryana and West Bengal (2)
1961-71	Gujarat, Kerala, Madhya Pradesh, Maharashtra, Orissa and Tamil Nadu (6)
1971-81	Bihar, Himachal Pradesh, Karnataka, Punjab, Rajasthan, Uttar Pradesh and West Bengal (6)

Eleven of the fourteen states, have consistently recorded a decline in the growth rate after reaching the peak level, suggesting that most of them are likely to register a further decline in the growth rate.

TABLE 3

Population, growth rates, sex ratios and couple protection rates

State	Population	Growth Rate		Sex Ratio		CPR as on 31.3.1990	
	(1991)	1971-81	1981-91	1981	1991	Ster.	All methods
Andhra Pradesh	66.30	(+)23.10	(+)23.82	975	972	36.0	45.2
Bihar	86.34	(+)24.06	(+)23.49	946	912	22.3	26.3
Gujarat	41.17	(+)27.67	(+)20.80	942	936	39.4	56.6
Haryana	16.32	(+)28.75	(+)26.28	870	874	32.0	58.2
Himachal Pradesh	5.11	(+)23.71	(+)19.39	973	996	36.8	50.0
Karnataka	44.82	(+)26.75	(+)20.69	963	960	37.5	45.4
Kerala	29.01	(+)19.24	(+)13.98	1032	1040	43.3	52.5
Madhya Pradesh	66.14	(+)25.27	(+)26.75	941	932	27.8	40.3
Maharashtra	78.71	(+)24.54	(+)25.36	937	936	43.6	56.4
Orissa	31.51	(+)20.17	(+)19.50	981	972	31.4	40.8
Punjab	20.19	(+)23.89	(+)20.26	879	888	39.3	74.2
Rajasthan	43.88	(+)32.97	(+)28.07	919	913	21.5	29.5
Tamil Nadu	55.64	(+)17.50	(+)14.94	977	972	43.8	56.2
Uttar Pradesh	138.76	(+)25.49	(+)25.16	885	882	19.9	33.8
West Bengal	67.98	(+)23.17	(+)25.55	911	911	29.5	34.0
India	843.93	(+)24.66	(+)23.50	934	929	30.1	43.3

SEX RATIO

The census has reported a sex ratio of 929 females for 1000 males which

is lower than that recorded in 1981. This is the lowest sex ratio to be recorded in this century. Further, the sex ratio of 929 is much lower than 941 projected by the Expert Committee in 1985, and later, by the Standing Committee of Experts on Population Projections in 1989. An increase in the sex ratio was expected since it was assumed that the expectation of life for females will grow at a faster pace than for males and the average expectation of life during 1986-91 would be 58.1 for males and 59.1 for females. The decline in the sex ratio could partially be due to a relatively greater under-enumeration of females than males. This would require further examination.

The sex ratio has declined by more than seven points during 1981-91 in the states of Bihar, Madhya Pradesh and Orissa. In fact, the decline in Bihar is by 34 points from 946 to 912 which certainly requires a detailed probing. However, the sex ratio has increased in favour of females by more than seven points in Kerala and Punjab.

The sex ratio is an important indicator as it reflects women's status in the country, and a lower sex ratio is a consequence of the relatively higher mortality levels amongst women.

Correlation analysis shows that the states which recorded a higher sex ratio (that is, the number of females per 1000 males) in 1991 have also recorded lower growth rates during 1981-91. This implies that women's status as reflected by the sex ratio has a significant impact on the growth rate of the population.

LITERACY

Female literacy has increased during 1981-91 from 29.8 to 39.4; the literacy rate for males has gone up from 56.4 to 63.9. Further, every state has registered an improvement in literacy levels both for males and females.

Kerala has recorded the highest female literacy rate (86.9 per cent); other states recording female literacy above 50 per cent are Tamil Nadu, Maharashtra and Himachal Pradesh. However, many states in north India like Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh still have literacy levels below 30.

An analysis of literacy levels for 1981 and 1991 shows that the gap between male and female literacy rates has somewhat narrowed in 1991 compared to 1981. At the all-India level, female literacy increased by 32.5 per cent while that of males increased by 13.3 per cent (Table 4). The rate of growth of literacy for females is higher than that for males in each of the major states. This is an encouraging trend.

Most studies and surveys show a close affinity between female literacy and fertility. Correlation analysis between the growth rate of the population during 1981-91 and female literacy levels in 1991 shows that, by and large, states recording a high level of female literacy have recorded a lower

TABLE 4

Percentage literate in population aged seven years and above and rate of growth in literacy

State	1981		1991		% increase(1981-91)	
	Male	Female	Male	Female	Male	Female
Andhra Pradesh	46.83	24.16	56.24	33.71	20.09	39.53
Bihar	46.58	16.51	52.63	23.10	13.00	39.92
Gujarat	65.14	38.46	72.54	48.50	11.36	26.11
Haryana	58.49	26.89	67.85	40.94	16.00	52.25
Himachal Pradesh	64.27	37.72	74.57	52.46	16.03	39.45
Karnataka	58.72	33.16	67.26	44.34	14.54	33.72
Kerala	87.74	75.65	94.45	86.93	7.65	14.91
Madhya Pradesh	48.41	18.99	57.43	28.39	18.63	49.50
Maharashtra	69.66	41.01	74.84	50.51	7.44	23.17
Orissa	56.45	25.14	62.37	34.40	10.49	36.83
Punjab	55.52	39.64	63.68	49.72	14.70	25.13
Rajasthan	44.76	13.99	55.07	20.84	23.03	48.96
Tamil Nadu	68.05	40.43	74.88	52.29	10.04	29.33
Uttar Pradesh	47.43	17.18	55.35	26.02	16.70	51.46
West Bengal	59.93	36.07	67.24	47.45	12.20	30.72
India	56.37	29.75	63.86	39.42	13.29	32.50

growth rate in population and vice versa. Similarly, improvement in female literacy is also strongly correlated with the growth rate; the greater the improvement in female literacy during 1981-91, the lower the growth rate of population.

ESTIMATES OF BIRTH RATES AND DEATH RATES

According to the Sample Registration System (SRS) the average birth and death rates recorded during the nine year period 1981-1989 were 32.8 and 11.5. The estimated birth and death rates for 1989 were 30.5 and 10.2. The trend in these rates during 1981-89 suggests that a birth rate of 30 and a death rate of 10 may be expected in 1990. Thus, the average birth rate for the decade 1981-90 according to the SRS, would be around 32.5 and the death rate would be 11.3 giving a growth rate of 2.12 per cent for the decade 1981-91.

The Standing Committee on Population Projections in its report in 1989, projected the birth rate during the decade at 32.2 and death rate at 11.4 which implies an average growth rate of 2.08 per cent during the decade 1981-91. A re-adjustment of these figures to yield the actual growth rate of 2.11 per cent would place the birth rate at 32.5 and the death rate at 11.4 which are quite close to estimates based on SRS results.

The overall picture in regard to the fall in birth and death rates would be as follows:

Decade	Birth rate	Death rate	Exponential growth rate
1961-71	41.2	19.2	2.20
1971-81	37.2	15.0	2.22
1981-91	32.5	11.4	2.11

The above table shows that the birth rate has been consistently declining during the last three decades. The overall decline in the 20 years since 1961-71 (centred in 1966) to 1981-91 (centred in 1986) was of the order of 8.7 points, that is, at a rate of 0.45 per year. The pace of decline has to be boosted upwards at twice the present rate if the goal of attaining a birth rate of 21 by the turn of this century is to be achieved. This would of course require re-invigoration of the family planning programme in all its aspects.

GROWTH RATES VIS-À-VIS FAMILY PLANNING PROGRAMME

The effect of the family planning programme in terms of a reduction in the birth rate at the all India level has been indicated above. A detailed analysis of family planning performance, represented by the estimated Couple Protection Rates(CPR), shows that CPR increased in all the major states of the country during 1981-90, and that relatively high CPRs levels (above 50 per cent) were recorded by Gujarat, Haryana, Himachal Pradesh, Kerala, Maharashtra, Punjab and Tamil Nadu, and relatively low CPR levels (less than 35 per cent) were recorded by Bihar, Rajasthan and Uttar Pradesh.

Correlation analysis shows that states which recorded higher CPRs, by and large, also recorded lower growth rates during 1981-91 (Table 3). However, the relationship is not statistically significant. The relationship becomes quite significant if the CPR for sterilisation alone is related to population growth rate. The analysis then leads to the conclusion that states which have recorded high couple protection rates in sterilisation have also recorded, by and large lower growth rates of population.

Hypothetical population in the absence of family planning

The family welfare programme is said to have averted 44 million births up to March, 1981 and about 130 million births up to March 1991. By making appropriate assumptions in regard to (a) levels of expectation of life for males and females during 1966-81 and 1981-91; (b) sex ratio at birth which was taken as 105 males for every 100 females; (c) discounting of births averted

due to possible non-effective coverage; and (d) appropriate life tables, probable survivors among the births averted as of March 1981 and March 1991 were estimated at 30.9 million and 95.2 million respectively. This implies that but for family planning programme, an additional population of about 31 million could have been enumerated in 1981, and the 1991 census count would have enumerated an additional 95 million. This means that the 1991 population, in the absence of the family planning programme, would have been around 939 million as against 844 million, and the growth rate of population during 1981-91 would have been 31.5 per cent in lieu of 23.5 per cent.

SUMMARY

The salient features emerging from this review of the provisional results of the 1991 census are as follows:

1. The annual growth rate of population which was constantly rising since 1941-51 attained the highest figure of 2.22 per cent during 1971-81 and has now declined to 2.11 per cent during 1981-91.

2. Out of the fifteen major states (excluding Assam and Jammu & Kashmir) eleven states recorded a decline in the growth rate of population during 1981-91 compared to the previous decade.

3. Fourteen of the fifteen major states have already attained their peak growth rate, mostly in 1961-71 or in 1971-81. There is only one state i.e. Andhra Pradesh which has consistently recorded an increasing growth rate since 1941-51.

4. Literacy levels have increased in the country as well as in each state and union territory, both for males and females during 1981-91. Even though the gap between male and female literacy levels has somewhat narrowed in 1991 compared to 1981, it is rather still wide, female literacy levels being lower than male literacy levels in every major state. However, a rise in female literacy from decade to decade augurs well for the family planning programme since female literacy is crucial for shaping women's behaviour towards fertility and family planning.

5. Correlation analysis shows that by and large lower growth rates of population have been recorded by States which have (a) a higher sex ratio in favour of females, (b) higher female literacy, and (c) a higher couple protection rate for sterilisation.

6. In the absence of detailed information on migration and other demographic features, it is provisionally estimated that the birth rate has fallen from an average of 37.2 in 1971-81 to about 32.5 in 1981-91. During the same

period, the death rate has fallen from 15.0 to 11.4.

7. The rate of decline in birth rate is around 0.45 per year during the last 25 years and this has to be doubled to about 0.9 to 1.0 if the goal of a birth rate of 21 is to be achieved by the turn of this century.

8. It is estimated that in the absence of the family planning programme, an additional population of about 31 million and 95 million would have been enumerated in the 1981 and 1991 censuses respectively. Thus, the growth rate of the population during 1981-91 would have been 31.5 per cent in lieu of 23.5 per cent.

THE SEX RATIO IN INDIA: A TOPIC OF SPECULATION AND RESEARCH

PROF. TARA KANITKAR *

In India, interest in the paucity of the number of women compared to men is as old as census-taking itself. All the Census Commissoners had shown a keen interest in the sex ratio of India and its provinces; in each census report from 1871-72 to 1931, there is a separate chapter on "sex proportion" or "sex" in which an interpretation of the relative number of males and females is presented. The results of the 1871-72 census of British India indicated that there were 98 million males and 92.5 million females—leading to a sex ratio of 940 females per 1000 males. This finding shocked the British census officials as it was contrary to the situation in England and Wales; the 1871 census of England and Wales reported "nearly 105 females to every 100 males". Initially, the census authorities attributed the observed deficit of females in India to the undercounting of females. Thus, the India Office Memorandum on the Census of British India for 1871-72 states that ".... perhaps the excess of males is to a large extent only apparent being due either to the omission of females owing to the low estimation in which they are held or due to their systematic concealment in consequence of the reticence practised in the oriental country on all matters connected with female relations"[1].

The 1871-72 Census of India being the first census, created several doubts in the minds of Indians about the objectives of census-taking in India. The rumour that the object of census-taking in India was to secure women for the European soldiers, might have led to the "concealment of females in the census". The census of 1881 also found a deficit of females—the sex ratio being 954 females per 1000 males. This apparent imbalance was again attributed to the omission of females in India.

One learned woman in India, Pandita Ramabai Saraswati observed after the results of the 1881 census that there was a deficit of over five million women. She was knowledgeable enough to realise that numerical paucity of women in India was an unnatural phenomenon and tried to pinpoint the causes: "Chief among the causes which have brought about this surprising numerical difference between the sexes may be named, after female infanticide in certain parts of the country, the imperfect treatment of the diseases of women in all parts of Hindustan, together with a lack of proper hygienic care and

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medical attendance"[2]. What Pandita Ramabai Saraswati observed a hundred years ago, has not changed much, except perhaps in the case of female infanticide.

Later censuses, however, did not evade the fact that there was a numerical deficiency of females in India by attributing the deficit to the under-reporting of women. The 1981 Census Commissioner of India states, "We must enquire, accordingly, whether there are any special reasons for believing that the deficiency of women is a fact and due to social causes such as the neglect if not the actual murder of young girls, or to a normally greater mortality amongst this sex than amongst the males, or finally to an initial shortness of supply"[3].

The chapter on "Sex" in the Census of India 1891, however, opens with the statement, "Of the many problems that come to light in the course of reviewing the results of the Census of an Indian province, none is more perplexing than that of having to account for the varying proportion of the two sexes in different parts of the country". Exactly after a hundred years also, the most "perplexing" aspect of the 1991 census is the sex ratio. The chapter concludes by stating, "In conclusion, the information on sex distribution in India furnished by the census inquiries indicates that, as in most other countries, more boys are born than girls, but owing to the very much higher mortality amongst the former during the first year of life, the latter predominate in number until their vitality begins to be affected by special sexual influences from which the male is free, so that throughout almost the whole of the prime life, the females are to a greater or a less degree in defect, and the balance swings back only towards the end of life when the total number is insufficient to restore numerical equilibrium"[3].

After discussing the possibility of the "concealment of women" in the census returns, Sir Edward Gaits—the Census Commissioner of the 1901 census concluded that the concealment—intentional or otherwise—had a relatively small influence on the figures. Sir Edward who was also the Census Commissioner of the 1911 census, stated that under-enumeration might have been the case before 1881 when censuses were conducted in a "perfunctory" manner. However, for later censuses, arrangements for census-taking were made with utmost care, the enumerators were properly trained, and the work done by them was carefully checked. Special stress was laid on the importance of enumerating every single person and the inspecting officers paid particular attention to the necessity of securing a complete enumeration of females. However, while not denying the possibility of a few females having been omitted from the records, Sir Edward concluded that the "relatively high mortality amongst females was sufficient to account for the differences"[4].

Sir Edward also invited attention to the contrasting sex ratios of Western

European countries and India. The former ranged from 1003 females per 1000 males in Ireland to 1068 females per 1000 males in England and Wales, while that of India was 963 females per 1000 males. Sir Edward dismissed the theory of omission by quoting local variations in the sex proportion. He pointed out that there was no difference in the attitude towards women in the "United Provinces and in Bihar and yet in the natural population of the former there were only 902 females per 1000 males against 1009 in the latter". Later, Sir Edwards tried to investigate the reasons for the sex ratio which was unfavourable to Indian women, and enumerated a number of factors. Prominent among them are: son preference, unequal treatement given to boys and girls, female infanticide, neglect of female infants, early marriages, death consequent to child-birth, bad treatment to women and to some extent, hard work[5].

The 1921 census report took notice of the fall in the sex ratio during the past 20 years throughout the country. The decline was attributed chiefly to the absence of "famine mortality" which selects males, and the heavy mortality resulting from the epidemics of plague and influenza which had selected heavily on females[6].

The sex ratio of 1931 showed a further decline and reached 950. Mr. Hutton, the then Census Commissioner, took notice of this steady fall in the sex ratio, which had been going on since 1901. In a comprehensive analysis of the sex ratio in India, Mr. Hutton states that, "the comparative neglect of girls in infancy, the strain of childbearing during adolescence, and son preference are some important factors responsible for the paucity of women.

The 1931 report draws attention to the fact that in Cochin State, a steady rise in the age at marriage consequent to the rapid progress in female education and the gradual displacement of primitive methods of midwifery by modern and scientific methods had contributed to an appreciable decline in the death rate among young mothers. The report further concludes, "The gradual rise in the sex ratio is but the natural outcome of these improved conditions"[7].

Analysing the sex ratio by various communties, the report brings out a surprising finding—that among Hindus, the ratio of females to males increases inversely with the socioeconomic standing of the community. Thus, in Bombay Presidency, the sex ratios for the advanced, intermediate, and backward classes were 878, 935, and 956 (aboriginal tribes) respectively, and 953 for other backward classes. For the depressed classes, it rose to 982 females per 1000 males.

The subject of sex ratio in independent India finds a place in the 1951 census report. According to the Census Commissioner of India, differences in the sex ratio are to be sought in two facts, "First, males and females are not born in equal numbers; and second, they do not die in equal numbers either in infancy and childhood or in old age or in any particular age group

or at all ages taken together[7]".

The 1961 census count also revealed that the long-term trend of a declining sex ratio in India has continued unabated. Asoke Mitra, the then Census Commissioner of India, observed, "The deteriorating sex ratio reflects on our social health, for it indicates that the risk to female lives at most ages has not improved against that to male lives; on the contrary, it seems to emphasise that demographically we have not yet entered upon the modern industrial age with its complimentary characteristics of increased risks to male and reduced risk to female lives[8]." A detailed systematic analysis of the sex ratio in India, emphasising the reasons underlying the deficit of females observed from 1901 to 1961 was undertaken by Visaria[9]. This publication is the first analytical investigation into the peculiarities of the sex ratio observed in India and the factors underlying the shortage of women. The results of the 1971 census of India have made known that the declining trend in India's sex ratio has continued during 1961-71.

The sex ratio according to the 1971 census was 930 females per 1000 males and showed that it has declined from that of 1961 which was 941 females per 1000 males. The sex ratio of 1981—934 females per 1000 males recorded a marginal increase, and it was expected that this increased trend would continue. The population projection for India 1981-2001 envisaged that the sex ratio in 1991, 1996 and 2001 would be 940, 942 and 944 respectively.

The 1991 census has revealed that the sex ratio of the Indian population is 929 females per 1000 males. This has sent waves of shock to various groups in society. The five-point drop has evoked concern among demographers and several women's organisations. The decline in the sex ratio as observed in 1991 is perplexing as data from the Sample Registration System during the eighties show that the high female mortality thus far prevalent, was declining and a slightly higher life expectancy for the girl baby than for the boy baby was indicated. During 1981-91, maternal and child health care services received considerable attention: literacy and educational attainment of women increased, legal measures to control atrocities on women were introduced and the feminist movement was very active. The most shocking and puzzling observation was the very large decline in the sex ratio of the population of Bihar. In 1981, the observed sex ratio in Bihar was 946 females per 1000 males and in 1991 it fell to 912.

Women's organisations are of the view that not much elevation in the status of Indian women has taken place. Some demographers [9,10] are of the opinion that the decline in the sex ratio could be due to an undercount of women. Srinivasan[9] feels that due to social and communal conflicts in the large Hindi-speaking states, rural householders tended to under-report the young unmarried girls. Both situations are not indicative of the improved status of women in India. Are we back to square one?

REFERENCES

1. India Office: Memorandum on Census of British India for 1871/72, General Department 1876, Vol. 14.
2. Pandita Ràmabai: *The High Cast Hindu Woman*. First published in 1888 by George Bell and Sons, London; reprinted by Hyprian Press Inc., West Port, 1976, p. 14.
3. Census of India 1891: *A General Report*, Manas Publisher (reprinted), 1985, p. 285.
4. Gait, E.A.: *Census of India 1911, India, Part 1, Report*, Usha Publishers (reprinted) 1987, p. 208.
5. Natarajan, D.: *The changes in the sex ratio*, Census of India, 1971, *Census Centenary Monograph*, No. 6, New Delhi, 11, 1972, p. 86.
6. Hutton, J.H.: *Census of India—With complete survey of tribal life and system*, Vol. 1, Gian Publishing House, New Delhi (reprinted), 1986, p. 202.
7. Natarajan, D.: *Census of India—With complete survey of tribal life and system*, Vol. 1, Gian Publishing House, New Delhi (reprinted), 1986, p. 202.
8. Visaria, P.: "Sex ratio of the population of India", *Census Monograph Series, 1961*, Bombay (mimeo.), p. 242, 1968.
9. Srinivasan, K.: "Some observations from 1991 census figures". Paper presented at a symposium on the Results of 1991 Census: Population and Development Policy Implications, International Institute for Population Sciences, Bombay, 16 April 1991.
10. Premi, M.K.: *Economic Times*, 18 April 1991.

FEMALE LITERACY IN INDIA: THE SITUATION IN 1991

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One of the objectives of the National Perspective Plan for Women[1] is to promote literacy and universalise elementary school enrolment among females by the year 2000. Today, nine years from this date, we find that though there has been an improvement in female literacy rates, there is every indication at the present rate of change, that no more than half the nation's women will be literate at the turn of the century.

According to the provisional results of the 1991 census[2], there are a total of 362 million literate people in India; in other words, every other Indian aged seven and above today is literate. This compares impressively with the last two decades: in 1971 for example, only one out of three Indians was literate and in 1981, two out of five. But these average figures obscure the considerable variation in literacy observed across the population. One notable disparity is the gender imbalance in literacy rates; of the 362 million literate persons recorded in the country, only 132 million—about one out of three—are women.

This note examines changes in literacy since 1971 and focuses on gender specific changes in literacy in India on the whole and in its fourteen major states. Specifically, we should like to respond to the following questions: To what extent have female literacy levels improved? Has the relative position of women as compared to men improved in terms of literacy? Is the change uniformly evident or do gender differences in literacy vary regionally?

LITERACY LEVELS, 1971-1991

Table 1 presents gender specific literacy rates (ages 7 and above) for India and its fourteen large states in 1971, 1981 and 1991. For the first time in 1991, literacy rates have been measured for the population aged seven and above rather than for the 0+ population. Converting the 1981 rates to reflect the population aged seven and above is possible since single year figures are available for the total and the literate populations. Rates for 1981 and 1991 are taken from the provisional census figures[2].

In order to make the 1971 rates[3] comparable, the assumption was made that the single year age distribution of children (total and literate) aged 5-9

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years had not changed between 1971 and 1981. Hence the proportions aged 7-9 years of the total population aged 5-9 years observed in 1981 was applied to the 1971 population at this age. The total and literate populations aged 7-9 years were estimated and added to the observed total and literate populations aged ten and above in 1971 in order to obtain the populations respectively for ages seven and above. Literacy rates for the population aged seven in 1971 were then estimated.

TABLE 1

Literacy rates (ages 7 and above), 1971 to 1991, India, by state and region

	1971			1981			1991		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
India	36.24	48.52	22.94	43.56	56.37	29.75	52.11	63.86	39.42
Statewise literacy rates									
1. Andhra Pradesh	29.99	40.53	19.15	35.66	46.83	24.16	45.11	56.24	33.71
2. Bihar	24.56	37.73	10.69	32.03	46.58	16.51	38.54	52.63	23.10
3. Gujarat	44.00	56.72	30.31	52.21	65.14	38.46	60.91	72.54	48.50
4. Haryana	33.56	46.42	18.59	43.85	58.49	26.89	55.33	67.85	40.94
5. Karnataka	38.73	51.17	25.67	46.20	58.72	33.16	55.98	67.25	44.34
6. Kerala	73.35	81.34	65.36	81.56	87.74	75.65	90.59	94.45	83.93
7. Madhya Pradesh	27.73	40.89	13.67	34.22	48.41	18.99	43.45	57.43	28.39
8. Maharashtra	48.13	62.65	32.41	55.83	69.66	41.01	63.05	74.84	50.51
9. Orissa	32.11	46.93	17.03	40.96	56.45	25.14	48.55	62.37	34.40
10. Punjab	40.69	48.85	31.27	48.12	55.52	39.64	57.14	63.68	49.72
11. Rajasthan	23.75	35.73	10.52	30.09	44.76	13.99	38.81	55.07	20.84
12. Tamil Nadu	47.75	62.79	32.32	54.38	68.05	40.43	63.72	74.88	52.29
13. Uttar Pradesh	26.75	38.69	13.02	33.33	47.43	17.18	41.71	55.35	26.02
14. West Bengal	40.87	52.27	27.76	48.64	59.93	36.07	57.72	67.24	47.15
Literacy rates by broad regions									
1. Four* large northern states	26.00	38.51	12.22	32.75	47.06	16.95	40.86	55.02	25.06
2. Rest of India	42.71	54.84	29.72	50.38	62.25	37.83	59.21	69.44	48.49

* Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh

Source: Registrar General (1974; 1991).

Literacy rates have increased in general from 36 per cent in 1971 to 52 per cent by 1991; for males, literacy has increased from 48.5 per cent to 63.9 per cent, and for females from 22.9 per cent to 39.4 per cent. As in earlier censuses, it is no surprise that male literacy has consistently exceeded female literacy in every state, and by a considerable margin.

Of course, gender disparities in literacy continue. The lag between male and female literacy rates is well over twenty years: the female literacy rate of 39.4 per cent in 1991 was achieved by males long before 1971, and probably as early as 1961.

SEX SPECIFIC PATTERN OF IMPROVEMENT IN LITERACY

Table 2 presents gender specific decadal increases in literacy between 1971 and 1991.

TABLE 2

Decadal change in literacy, 1971 to 1991, India, by state and region

	1971–81			1981–91		
State	Total	Male	Female	Total	Male	Female
India	7.32	7.85	6.81	8.55	7.49	9.67
Statewise changes in literacy						
1. Andhra Pradesh	5.67	6.30	5.01	9.45	9.41	9.55
2. Bihar	7.47	8.85	5.82	6.51	6.05	6.59
3. Gujarat	8.21	8.42	8.15	8.70	7.40	10.04
4. Haryana	10.29	12.07	8.30	48	9.36	14.05
5. Karnataka	7.47	7.55	7.49	9.78	8.53	11.18
6. Kerala	8.21	6.40	10.29	9.03	6.71	8.28
7. Madhya Pradesh	6.49	7.52	5.32	9.23	9.02	9.40
8. Maharashtra	7.70	7.01	8.60	7.22	5.18	9.50
9. Orissa	8.85	9.52	8.11	7.59	5.92	9.26
10. Punjab	7.43	6.67	8.37	9.02	8.16	10.08
11. Rajasthan	6.34	9.03	3.47	8.72	10.31	6.85
12. Tamil Nadu	6.63	5.26	8.11	9.34	6.83	11.86
13. Uttar Pradesh	6.58	8.74	4.16	8.38	7.92	8.84
14. West Bengal	7.77	7.66	8.31	9.08	7.31	11.08
Changes in literacy rates by broad regions						
1. Four* large Indian states	6.75	8.55	4.73	8.11	7.96	8.11
2. Rest of India	7.68	7.40	8.11	8.83	7.19	10.66

* Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh

While male literacy rates continue to be higher than female, the sex specific pattern suggests that the pace of improvement is more rapid for females. For the first time, during the 1981-1991 decade, we see that female literacy rates have generally risen faster than male rates. This is a notable departure from earlier trends and suggests that the gender gap has now begun

to narrow. This narrowing pattern is observed throughout the country and in every single state (except one).

The gender specific decadal change in literacy rates during 1971-81 and 1981-91 shows an interesting pattern. In 1971-81, female literacy rates increased somewhat more gradually than those among males: 6.8 per cent and 7.9 per cent respectively. And, in only five of the fourteen large states could we see a higher rate of increase in female literacy compared to male literacy rates: Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal.

By 1981-91, the rate of increase for females has surpassed that of males in every single state except Rajasthan where improvements in female literacy appear to be most sluggish. Over this decade, literacy rates increased by 9.7 per cent among females compared to 7.5 per cent among males.

Table 3 presents two indices of the gender disparity in literacy over time, that is the male-female difference in literacy rates and the female-male ratio of literacy rates. The lower the difference, the narrower is the differential by sex.

TABLE 3

Gender differences in literacy rates, 1971 to 1991, by state and region

State	Male-female difference in literacy rates			Female literacy rate as % of male literacy rate		
	1971	1981	1991	1971	1981	1991
India	25.6	26.6	24.4	47.3	52.8	61.7
Statewise gender differences						
1. Andhra Pradesh	21.4	22.7	22.5	47.3	51.6	59.9
2. Bihar	27.0	30.1	29.5	28.3	35.4	43.9
3. Gujarat	26.4	26.7	24.0	53.4	59.0	66.9
4. Haryana	27.8	31.6	26.9	40.0	46.0	60.3
5. Karnataka	25.5	25.6	22.9	50.2	56.5	65.9
6. Kerala	16.0	12.1	10.5	80.4	86.2	88.9
7. Madhya Pradesh	27.2	29.4	29.0	33.4	39.2	49.4
8. Maharashtra	30.2	28.7	24.3	51.7	58.9	67.5
9. Orissa	29.9	31.3	28.0	36.3	44.5	55.2
10. Punjab	17.6	15.9	14.0	64.0	71.4	78.1
11. Rajasthan	25.2	30.8	34.2	29.4	31.3	37.8
12. Tamil Nadu	30.5	27.6	22.6	51.5	59.4	69.8
13. Uttar Pradesh	25.7	30.3	29.3	33.7	36.2	47.0
14. West Bengal	24.5	23.9	20.1	53.1	60.2	70.1
Gender differences by broad region						
1. Four* large northern states	26.3	30.1	30.0	31.7	36.0	45.5
2. Rest of India	25.1	24.4	21.0	54.2	60.8	69.8

* Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh

The male-female difference in literacy has improved marginally at the all India level: from 25.6 in 1971 to 26.6 in 1981 to 24.4 per cent in 1991. But at the state level, the pattern is different. Consistent narrowing over the last two decades is seen *only* in states with higher than average female literacy rates: Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal.

A better measure of the relative position is the female to male ratio of literacy rates. This ratio ranges from 0 to 100; the closer it is to 100, the narrower is the gender disparity. Expressed as a percentage, we can interpret it as the relative difference in literacy between males and females. This ratio of literacy rates has increased consistently in every single state over the twenty year period. For India as a whole, the ratio increased from 47.3 in 1971 to 52.8 in 1981 and 61.7 by 1991. By this indicator, then, in every state, female literacy levels have continued their steady improvement.

Nevertheless, as seen in Table 4, the absolute number of female illiterates continues to be unacceptably high: 202 million in 1991, compared to 130 million male illiterates.

There is evidence however that the rate of increase in illiterates has actually diminished. Between 1971 and 1981, there was an increase of roughly 14 per cent in the number of illiterate women; this has fallen to 10 per cent over the most recent decade. In comparison, the number of male illiterates increased by 8 per cent between 1971 and 1981 and 5 per cent in the 1981-91 decade. Of course, as a result, females constitute an increasing proportion of all illiterates in the country—up from 58 per cent in 1971 to 60 per cent in 1981 and 61 per cent in 1991.

REGIONAL DIFFERENCES

The cultural, socio-economic and demographic heterogeneity of India has been repeatedly observed. We can roughly disaggregate the country into two broad groups: the four large northern states, namely Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh—comprising roughly two-fifths of India's population—which have been characterised by a sluggish pace of development and demographic transition and the rest (60 per cent of the country's population), characterised by generally faster development[4].

The situation of women in this region is markedly worse than that of women in the rest of India. Culturally, women have little autonomy or control over resources in this region, are denied both freedom of movement as well as a role in household decision making. Wide gender disparities are reflected in numerous ways, some not easily measurable in routine surveys and censuses. One notable indicator is the disparity between male and female literacy rates in this region compared to the rest of the country—a disparity that persists till today.

Gender disparities in literacy are undoubtedly evident throughout the

TABLE 4

Illiterate population, 1971 to 1991, India, by state and region

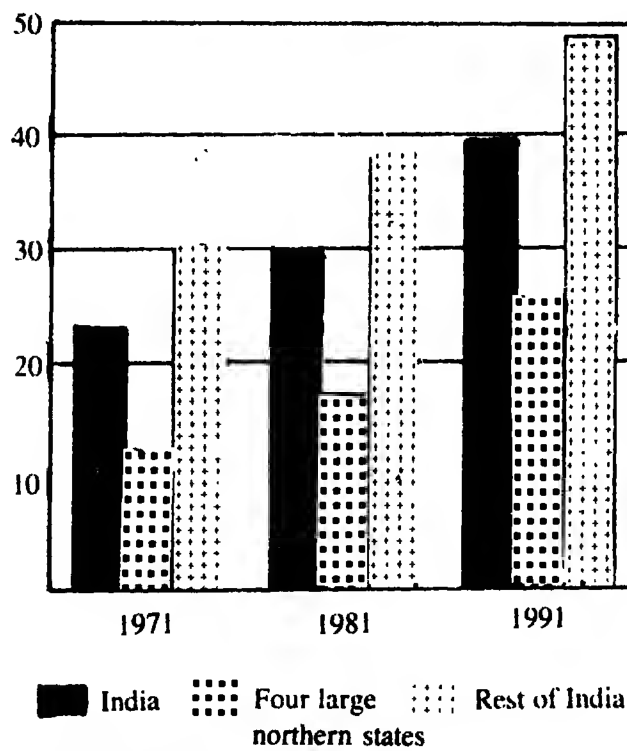
	1971			1981			1991		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
India	276045576	116075948	159854002	305316992	122399991	182917001	332420790	130247950	202183649
[illegible] distribution of illiterate population									
[illegible] Pradesh	24301650	10473144	13827536	28142504	11794997	16347507	30225951	12196668	18023557
[illegible]	33170037	14036869	19132116	37717318	15303589	22413729	42824877	17259821	25560178
[illegible]	11831268	4736185	7097665	13355422	5019295	8336127	13647419	4947848	8701760
[illegible]	5159314	2240500	2917263	5839012	2317561	3521451	5999899	2308904	3691540
[illegible]	14220475	5814137	8401682	16296175	6380076	9916099	16571680	6266644	10300955
[illegible]	4610162	1593746	3033629	3968214	1291959	2676255	2353589	676238	2134832
[illegible] Pradesh	23194077	9830180	13350458	26466668	11150159	15316509	30574686	11934904	18642588
[illegible]	20800218	7807356	12980838	22899949	8139935	14760014	25083168	8805816	16272089
[illegible]	11812169	4669234	7135456	12770803	4762045	8008758	13683162	5063380	8618743
[illegible]	6996779	3016992	4054207	7200207	3297180	3903027	7465595	3363706	4101042
[illegible]	15243701	6749416	8491182	19002035	7861911	11140124	21471323	8275601	13199653
[illegible]	17577390	6330517	11250835	18563247	6572036	11991211	17299283	6060692	11238346
[illegible]	50856011	22786123	28061742	58856268	24784489	34071779	65502664	26837193	38674856
[illegible]	20701635	8979825	11699527	23155269	9525317	13629952	23966973	9770226	14197115
[illegible] by broad region									
[illegible]	[illegible]	53401132	69033534	142042289	59100148	82942141	160441809	64328872	96146792
[illegible]	[illegible]	62674816	90820468	163274703	63299843	99974860	171978981	65919079	[illegible]

country—but the regional picture suggests that disparities are far wider in these four northern states than in the rest of India. For example, the 1991 census reveals that while these states comprise 40 per cent of the national population, they comprise 31 per cent of the nation's literate population and 24 per cent of all literate females.

A look at Figure 1 (and Table 1) suggests in fact that these four large northern states continue to be roughly twenty years behind the rest of India: they have achieved in 1991 a literacy rate which the rest of India achieved in 1971. And women in these states have not yet reached the level that women in the rest of India attained twenty years ago.

Figure 1

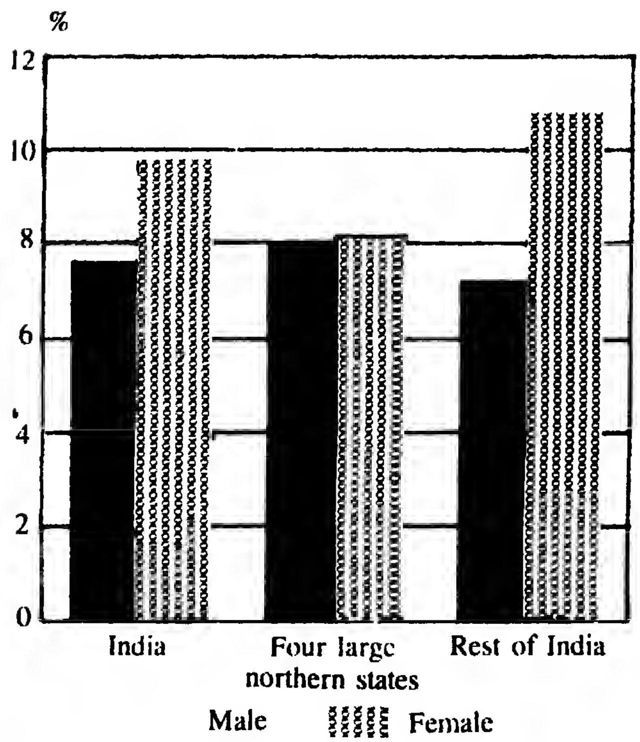
Female literacy rates, ages 7+, 1971-91



Source : RG, 1991

From Figure 2 (and Table 2) we obtain yet another disturbing comparison. Not only are literacy levels lower, but the pace of increase in literacy in this region is considerably slower than that reported for the rest of India. Over the ten years between 1981 and 1991, while literacy rates among females increased by 9.7 per cent in India on the whole, they increased by no more than 8 per cent in these four states, compared to 11 per cent in the rest of the country. And while, for the first time, the rate of increase among females

Figure 2
Decadal change in literacy, 1981-91



Source: RG, 1991

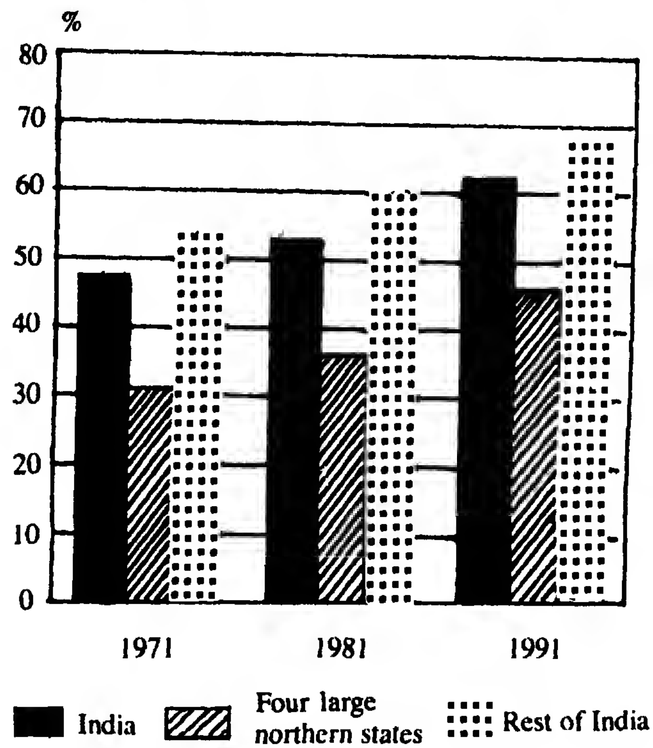
has outstripped that among males (9.7 per cent compared to 7.5 per cent among males) for India as a whole, this is especially evident in the rest of India (10.1 per cent and 7.1 per cent respectively). In contrast, the four large northern states record a nominal difference in the rate of increase (8.1 per cent for females compared to 7.9 per cent for males).

The pattern of male-female difference in literacy rates over time, reported in Table 3, again displays considerable regional variation. In short, while the "rest of India" has recorded a consistent narrowing of this difference between 1971 and 1991, in the four large northern states in fact, the difference was narrowest in 1971, became wider in 1981 and has essentially remained unchanged since—suggesting again that male literacy rates have increased much more rapidly during this period than female.

In contrast, the female to male ratio of literacy rates has increased (Table 3) in every single state, including each of these four states and the rest of India. As seen in Figure 3, in these four large northern states, the ratio has improved from 31.8 to 45.6; over the same period, the ratio has increased from 53.6 to 68.4 in the rest of India. Despite this improvement, we find

that the four large northern states are lagging by well over twenty years as compared to the rest of India: the ratio achieved by these four states in 1991 (45.6) was surpassed by the rest of India even in 1971.

Figure 3
Female literacy rate as proportion of male, 1971-1991



Source: RG, 1991

DECADES TO UNIVERSAL LITERACY

Despite the few encouraging signs reflected in the results of the 1991 census, the hopes of achieving universal literacy for females in the near future, from the perspective of the 1991 census, are extremely dim. A very rough calculation of the number of decades to achieve full literacy is presented in Table 5.

The method used is that applied by Sharma and Retherford[5] in their analysis of literacy trends as gleaned from the *1981 census. Projections are* based on the trend in literacy rates observed between 1981 and 1991 and assume that during each future decade the rate will increase by the increase observed between 1981 and 1991. Thus, the number of decades to achieve full literacy is calculated as: (100 – LR1991)/ (LR1991-LR1981) (where LR denotes the literacy rate). Of course, this is based on the perhaps simplistic

TABLE 5

Average number of decades required to reach universal literacy, India, by state and broad region

	Total	Male	Female
By state			
1 Andhra Pradesh	5.8	4.7	6.9
2. Bihar	9.4	7.8	11.7
3 Gujarat	4 5	3.7	5.1
4 Haryana	3.9	3.4	4.2
5. Karnataka	4.5	3.8	5.0
6 Kerala	1.0	0.8	1.9
7 Madhya Pradesh	6.1	4.7	7.6
8 Maharashtra	5.1	4.9	5.2
9 Orissa	6.8	6.4	7.1
10 Punjab	4.8	4.5	5.0
11. Rajasthan	7.0	4.4	11.6
12 Tamil Nadu	3.9	3.7	4.0
13 Uttar Pradesh	7.0	5.6	8.4
14 West Bengal	4.7	4.5	4.8
By broad region			
1. Four* large northern states	7.3	5.6	9.2
2 Rest of India	4 6	4.2	4.8
India	5 6	4.8	6.3

* Bihar. Madhya Pradesh. Rajasthan and Uttar Pradesh.

assumption that other things do not change—level of commitment to literacy, and fertility and growth rates in particular.

We find considerable statewise variation in the number of decades required to reach full literacy, especially among women. For example, on average it will take only 10 years for Kerala to achieve universal literacy: its males will achieve this by the turn of the century, while its women will achieve this distinction by 2010. On the other extreme, the four large northern states will achieve universal literacy in over seven decades and continue to display the widest gender disparities in the process—56 years for its males and almost a century (92 years) for its females. Even the remaining 60 per cent of the country will attain this goal no sooner than half a century from now (42 years for males and 48 for women). On "average", it may take India over half a century (56 years) to achieve universal literacy: 48 years for its males and 63 for its females. But if we consider India to have achieved universal literacy only when every single state in the country has achieved it, prospects are even more disturbing: three quarters of a century for males

and well over a century (117 years) for females.

CONCLUSION

In short then, the results suggest that by all these indicators, in every state, female literacy levels have continued their slow and steady improvement and the gender gap is narrowing. For the first time, we see a somewhat more rapid rate of increase in female literacy than in male, and gender disparities as measured by a number of indicators confirms this. The male to female ratio of literacy rates has similarly narrowed in every single state.

Nevertheless, though this is an encouraging trend, the issue of accelerating improvements in female literacy continue to be of concern. The pace at which female literacy is increasing continues to be slow—even in 1991, no more than two out of five women in this country can read and write—and the literacy rate continues to increase by less than ten per cent per decade for the country as a whole.

Regionally, the picture for 40 per cent of the nation's population is extremely disturbing. Not only are female literacy rates considerably lower in the four large northern states compared to the rest of India, but the rate of decadal improvement continues to be slower. In each of these four states, female literacy rates remain below 30 per cent. So also, the narrowing of gender disparities has been far less successful in the four large northern states compared to the rest of India; the female literacy rate in these states constitutes less than half of the male literacy rate—compared to over two-thirds of it in the rest of the country.

In short then, even today, no more than two out of five Indian women are literate—ranging from as few as one out of four in the four large northern states to every other woman in the rest of India. The pace at which female literacy is increasing continues to be slow—about 8 per cent per decade in these four states and 10 per cent in the rest of India. At this pace, it will be roughly fifty years before the rest of India achieves universal female literacy and as much as a century before the four large northern states do. Given that these states contain two-fifths of India's population, and about half of its illiterate population, this sluggish performance has particular relevance for the rate at which female literacy improves and gender discrepancies narrow in the future.

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REFERENCES

1. Ministry of Human Resource Development: *National Perspective Plan for Women*. Ministry of Human Resource Development. Department of Women and Child Welfare, Government of India. New Delhi. 1986.
2. Registrar General, India: *Census of India: Provisional Population Totals*. Series 1, India, Paper 1 of 1991. Office of the Registrar General. New Delhi. 1991.
3. Registrar General, India: *Census of India. 1971. Social and Cultural Tables*. Series I, Part II)C (ii). Office of the Registrar General. New Delhi. 1974.
4. Satia. J.K. and Jejeebhoy, J. Shireen: "Overview". In J.K. Satia and Shireen J. Jejeebhoy, Eds *The Demographic Challenge : A Study of Four Large Indian States*. Oxford University Press, Bombay (forthcoming) 1991.
5. Sharma, O.P. and Retherford, R.: *Recent Literacy Trend in India*. Office of the Registrar General. New Delhi. 1987.

AN APPRAISAL OF POPULATION GROWTH IN CITIES OF INDIA AND MAHARASHTRA

DR. KAMLA GUPTA*

Indian cities along with cities in other developing countries are under very severe strain because of their fast-increasing requirements for various services due to very rapid rates of population growth. The social and physical infrastructure is totally inadequate for serving the needs of the rapidly growing population and the increasing concentration of population in them. Hence, the population growth in cities, and particularly in big cities, has always been a matter of grave concern to city planners, administrators and policy makers.

The recently published Paper 1 of the 1991 Census of India presents data on very few selected population characteristics for India and its states. Even an urban-rural break-up of the population of India and its states is not yet available, and hence nothing is known about the growth of population in rural and urban areas even for the country as a whole. Some newspaper articles published immediately after the release of the provisional 1991 census figures, however, have cited population size and growth in a few metropolitan cities of India. Paper 1 of the Maharashtra State Census has also furnished population figures of those cities of Maharashtra by sex which had a population of over 100,000. It also gives the sex ratios and the absolute number of literates in these cities for the population aged 6+ years for both sexes. In the light of the scanty data, the population growth in cities and related issues in the case of a few metropolitan cities of India and Class I cities of Maharashtra have been discussed here.

The city of Greater Bombay, which was a single unit untill 1981 is now an urban agglomeration (UA), and as such, its population is much higher than that of the Calcutta urban agglomeration. Even in 1981, the population of the Greater Bombay UA was marginally higher than that of the Calcutta UA. Thus, the Greater Bombay UA becomes the largest urban concentration of India and perhaps second largest concentration of Asia.

The highest population growth rate has been registered in the Hyderabad UA followed by UAs in Delhi and Bangalore (Table 1). The two premier cities of India namely, Calcutta and Bombay, have registered a very low growth rate of population, even less than the average growth rate for the country as a whole. Another significant observation is that except Hyderabad,

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in all the other cities the rate of population growth has declined substantially during 1981-91 compared to the previous decade; the most significant decline being in the case of Greater Bombay city.

TABLE 1

Population growth in some metropolitan cities of India, 1971-91

	Population size (millions)		Decadal percent growth	
	1981	1991	1971-81	1981-91
Calcutta U.A	9.19	10.86	30.75	18.17
Greater Bombay city	8.24	9.91	38.07	20.27
Greater Bombay UA	9.70	12.57	53.92	29.59
Delhi UA	5.73	8.38	57.09	46.25
Madras UA	4.29	5.36	35.31	24.94
Hyderabad UA	2.54	4.27	41.72	68.11
Bangalore	2.92	4.11	76.67	40.75

The rate of growth of population in Greater Bombay during the 1981-91 period has been an all-time low in the twentieth century, except for the 1921-31 decade. In the absence of migration data it is difficult to conclude whether under-enumeration or the dispersal of population is responsible for such a significant reduction in the growth rate of the population in Greater Bombay city. However, the possibility of a very high magnitude of under-enumeration is ruled out mainly because

1. there is no evidence of the omission of large areas from the census enumeration. Hence, there is no reason to believe that the undercount of population in the 1991 census is of much greater magnitude than that in earlier censuses,
2. media coverage as well as awareness regarding census-taking was much greater in case of the 1991 census than in earlier censuses,
3. special efforts were made to enumerate the population in difficult areas such as Dharavi, Kamathipura etc. Many social workers working in these areas were involved and requested to accompany and assist the census enumerators to collect information from these areas.

The dispersal of population as well as the decrease in the rate of migration seem to have worked simultaneously to bring down the decline in the rate of population growth during 1981-91 in Bombay city. The 1986 Annual Report of the Executive Health Officer of Greater Bombay Municipal Corporation has given the birth and death rates for Greater Bombay for 1986 as 21.64 and 7.30 per 1000 respectively, resulting in a natural increase of 14.34 per thousand. Again, there is a continuous decline in the birth, death

and natural increase rates in Greater Bombay during 1981-86. We do not have data on birth and death rates for the remaining years of the past decade but looking at the trend during the first five years, it can be safely concluded that the rate of natural increase has declined continuously during the 1981-91 decade. If the rate of natural increase is taken as 1.43 per cent (that of 1986) for the entire 1981-91 decade, there will be an addition of around 1.26 million persons through natural increase during the decade.

A number of studies have shown that there has been a continuous decline in the share of migration as related to the total population growth of Bombay city as well in the net migration rate[1,2,3] to the city. Though nearly 1.57 million people moved to Bombay city during the inter-censal decade of 1981-91, there is no data available on out-migration from Bombay city. It seems that there has been significant out-migration from the city to nearby urban centres. This process of out-migration had already started in the sixtees and has further intensified during each subsequent decade. A number of sections of the island city have registered a negative growth rate during 1961-71 and 1971-81. A number of factors have caused this out-migration. The typical geographical location of the city has made severly restricted land availability resulting in a continuous spurt in land prices. The land prices in Greater Bombay have soared to very high levels since the beginning of the eighties. According to a survey conducted by the Town and Country Planning Organisation in important cities of India, land prices in Bombay in 1983 ranged from a minimum of Rs. 150 per square metre to Rs. 1500 per square metre[4]. According to a recent article in a leading national daily, even a one bedroom flat in any locality in Greater Bombay did not cost less than Rs. 200,000; and was very much higher in posh localities like Bandra, Marine Lines etc.[5]. This high cost of housing as well as a number of other factors such as a conscientious government policy of developing other nodes both industrially as well as infrastructurally within the Bombay Metropolitan region, prolongation of the textile mill workers' strikes, and the shifting of some wholesale markets etc. have paid dividends in the form of a dispersal of population to nearby cities. The extension of BEST bus services to Vashi, Panvel, Nerul etc. has initiated this dispersal significantly. It is therefore probable that a number of migrants who came to the city during 1981-91 may have settled outside the city boundary sufficiently close to the main city. At the same time, a number of persons living in the city—particularly in the crowded main city—and occupying a small house, may have sold off their houses and moved to the nearby urban nodes of Vashi, Konkan Bhavan, Nerul, Panvel etc. where a massive construction of residential houses and small shopping centres was initiated by CIDCO. Private construction companies and builders also came in a big way in these areas as well as in the urban centres of Dombivali, Thane, Kalyan, Mira Bhayander etc. The extraordinarily

high growth rate of population in many of the above-mentioned nodes bears testimony to this significant dispersal.

In the following paragraphs, we discuss the variations in the population growth rate, sex ratios and literacy levels in the cities of Maharashtra.

According to Paper 1 of the Maharashtra 1991 Census, there are 27 cities in Maharashtra where the population is above 100,000. The number of Class I cities in Maharashtra in 1981 was 25. Thus, during the next ten-year period, only two cities have been added to this category. However, if we see the list of cities which are included in Class I category in 1981 and 1991, some change is noticed. The Thane UA and Ulhasnagar UA which were two separate Class I cities in 1981, have now been clubbed with Greater Bombay city and together they, along with some other units like New Bombay (Thane) and Mira Bhayander, form the Greater Bombay Urban Agglomeration, Kamptee, which was a part of the Nagpur UA in 1981, has now been identified as a separate UA. Besides this adjustment, only three cities—Bid, Yavatmal and Wardha—from the category of Class II towns in 1981 have graduated to Class I in 1991. In 1981, there were 19 towns and one urban agglomeration where the population ranged between 50,000 to 100,000 and a number of them could have graduated to Class I cities. Obviously, the population growth in them continued to be low only. Thus, as in the earlier period, the growth of medium towns in Maharashtra has not picked up even during the last decade.

The figures regarding the total urban population of the state are not yet available and hence it is not possible to determine the extent of increase in the level of urbanisation in Maharashtra during 1971-81. Some idea, however, could be obtained from the population of these cities.

In 1981, around 76.1 per cent of the total urban population of Maharashtra state was concentrated in cities which were identified as Class I cities in 1991. Together, they possessed around 27 per cent of the state's total population. In 1991, these cities possessed nearly 30 per cent of the state's total population. Their combined annual population growth rate during 1981-91 is around 3.5 per cent indicating that the urban concentration in favour of large cities in Maharashtra has further strengthened over the 1981-91 decade. The total population of these 27 cities and urban agglomerations in 1991 was 23.68 million, of which more than half is concentrated in the Greater Bombay UA only.

Leaving Mira Bhayander city which is included in the Greater Bombay UA, and which has registered a growth rate of 19.5 per cent per annum, Bhiwandi has registered the highest rate of population growth (Table 2) among all the Class I cities during 1981-91, followed by Kalyan and Thane cities, all having a population growth rate of more than 7.00 per cent per annum.

Cities experiencing an annual population growth rate between 5 to 7 per

TABLE 2

Distribution of cities of Maharashtra by annual average population growth rate categories, 1981-91

Very high (7.00% or above)		High (5.00-6.99%)		Medium (2.5-4.99%)		Low (Below 2.5%)	
Bhiwandi	(11.15)	Chandrapur	(6.68)	Nasik	(4.99)	Yavatmal	(1.98)
Kalyan	(9.95)	Aurangabad	(6.26)	Ichalkaranji	(4.74)	Solapur	(1.87)
Thane	(7.14)	Latur	(5.66)	Nanded	(4.21)	Gr.Bombay	(1.84)
		Parbhani	(5.54)	Akola	(3.75)	Kolhapur	(1.72)
		Jalgaon	(5.08)	Pune	(3.71)	Wardha	(1.52)
		Amravathi	(5.07)	Jalna	(3.69)	Ahmednagar	(1.41)
				Bid	(3.36)	Kamptee	(0.95)
				Malegaon	(3.31)	Gondiya	(0.84)
				Nagpur	(3.07)		
				Sangli	(3.02)		
				Ulhasnagar	(2.98)		
				Dhule	(2.77)		

cent are Chandrapur, Aurangabad, Latur, Parbhani, Jalgaon and Amravati. Goudia city recorded the least population growth rate (0.4 per cent per annum). Other cities with population growth rates below two per cent per annum are Yavatmal, Solapur, Bhusawal, Greater Bombay, Kolhapur, Ahmednagar and Wardha.

Cities which have registered low growth rates of population have been observed to belong to those districts in which the overall growth rate during 1981-91 was also low, indicating an out-migration from both rural as well as from urban areas.

SEX RATIO DIFFERENTIALS AMONG THE CITIES OF MAHARASHTRA

Urban sex ratios (females/1000 males) in India are often found to be lower than rural sex ratios generally because of male selective migration to urban centres. The variation in sex ratios among urban centres, however, are dependent on a variety of factors such as the rate of net migration, sex-wise selectivity in net migration, differentials in sex-wise mortality rates in cities due to different levels of urban development and so on. So far, only the magnitude of the variation in sex ratios among the cities and some probable reasons for these variations have been examined. No attempt has been made to explain these variations.

The range of city sex ratios in Maharashtra in 1991 vary from as high as 961 in Malegaon to as low as 647 in Bhiwandi (Table 3).

Some cities such as Malegaon, Gondiya, Solapur, Ahmednagar and Sangli have a sex ratio higher than even the average sex ratio of the country as a

TABLE 3

Distribution of cities of Maharashtra according to the categories of sex ratio, 1991

High (above 929)		Medium (900-929)		Low (800-99)		Very Low (800)	
Malegaon	(961)	Jalna	(929)*	Latur	(895)	Bhiwandi	(647)*
Gondiya	(948)*	Yavatmal	(923)	Chandrapur	(895)*		
Solapur	(946)	Wardha	(920)*	Khalkaranji	(892)		
Ahmednagar	(932)	Akola	(919)	Nasik	(889)		
Sangli	(930)	Kolhapur	(919)	Bid	(889)*		
		Bhusawal	(916)*	Kalyan	(876)		
		Parbhani	(915)	Aurangabad	(874)		
		Amravathi	(915)	Thane	(857)		
		Nagpur	(915)	Bhayander	(857)		
		Pune	(913)	New Bombay	(822)		
		Nanded	(910)	Greater Bombay	(820)		
		Dhule	(909)				
		Jalgaon	(907)				
		Kamptee	(906)				
		Ulhasnagar	(905)				

* Decline in sex ratio.

whole. The population growth rate in some of these cities has been consistently low, indicating an out-migration of males. For example, in case of Ahmednagar UA, the growth rate of population during 1981-91 was even lower than that of the district as a whole. The high sex ratio coupled with its low population growth rate indicates that a substantial out-migration has taken place from this city.

Bhiwandi has the lowest sex ratio. This district has registered the highest rate of population growth during 1981-91: the male population increased from 69,350 in 1981 to 229,510 in 1991, and the sex ratio declined from 663 to 647 respectively suggesting a very significant net male in-migration.

It has been observed that over the decades, the sex ratio in most of the cities in India has improved. Most of the cities of Maharashtra have conformed to this trend during the 1981-91 decade. Cities where the sex ratio has improved significantly (above 40 points) are Greater Bombay (48 points), Thane (50 points), Nasik UA (52 points) and Ahmednagar UA (85 points). There are, however, a few cities where the sex ratio has declined—Bid (20 points), Bhiwandi (16 points), Jalna (17 points), Chandrapur (11 points), Gondiya (6 points), Kalyan (2 points), Wardha and Bhusawal (1 point each).

LITERACY VARIATIONS IN THE CITIES OF MAHARASHTRA

The data available on literates are for persons aged 6+ years but the distribution of population by age group is not yet available. Therefore, it is not possible to calculate the literacy rates for the cities of Maharashtra. We have simply calculated the percentage of literates (6+ ages) for both the sexes separately and these are presented in Tables 4 and 5.

TABLE 4

Distribution of cities of Maharashtra by male literacy*, 1991

High (above 75%)		Medium (60-75%)		Low (60%)	
Wardha	(82.09)	Dhule	(74.41)	Bhiwandi	(59.74)
Kolhapur	(80.01)	Jalgaon	(74.20)		
Gondia	(79.80)	Ulhasnagar	(74.00)		
Yavatmal	(78.64)	Akola	(73.39)		
Bhusawal	(77.80)	Sangli	(73.17)		
Greater Bombay	(77.25)	Chandrapur	(72.56)		
Ahmednagar	(77.11)	Aurangabad	(71.56)		
Thane	(76.71)	Ichalkaranji	(71.56)		
Kalyan	(76.70)	Kamptee	(71.24)		
Mira Bhayander	(76.57)	Bid	(71.04)		
Nagpur	(76.53)	New Bombay	(70.60)		
Amravati	(76.14)	Latur	(69.51)		
Nasik	(75.50)	Nanded	(69.14)		
Pune	(75.45)	Solapur	(68.94)		
		Parbhani	(65.31)		
		Jalna	(64.19)		
		Malegaon	(61.76)		

*Percentage of male literates aged 6+ years to total male population.

The male literacy level among the cities of Maharashtra varied from more than 80 per cent in Wardha city (82.09 per cent) to about 59.74 per cent in Bhiwandi city.

Wardha and Jalna cities registered the highest and the lowest female literacy levels respectively. The female literacy level in Bhiwandi city is also very low, very close to the lowest.

It is clear from Tables 4 and 5 that only the female literacy level is significantly lower than the male literacy level in all the cities, but the disparity in case of female literacy level in the cities is more pronounced (around 30 points) than in the case of males (around 22 points).

TABLE 5

Distribution of cities of Maharashtra by female literacy*, 1991

High (above 60.00%)		Medium (50-60%)		Low (50%)	
Wardha	(71.67)	Dhule	(59.92)	Malegaon	49.38)
Kolhapur	(66.30)	Jalgaon	(59.92)	Latur	48.35)
Yavatmal	(66.24)	Sangli	(56.97)	Solapur	47.22)
Amravati	(65.46)	New Bombay	(56.46)	Parbhani	(45.35)
Kalyan	(65.10)	Dhandrapur	(56.44)	Bhiwandi	(41.65)
Nagpur	(64.78)	Kamptee	(56.42)	Jalna	(41.32)
Gondia	(64.69)	Aurangabad	(56.44)		
Gr. Bombay	(46.59)	Kamptee	(56.42)		
Thane	(63.98)	Aurangabad	(53.27)		
Ahmednagar	(63.35)	Ichakaranji	(52.86)		
Pune	(62.72)	Bid	(51.23)		
Bhusawal	(62.13)	Nanded	(50.04)		
Ulhasnagar	(61 86)				
Akola	(61.68)				
Nasik	(61.19)				
Mira Bhayander	(64.44)				

* Percentage of female literates aged 6+ years to total female population.

CONCLUSIONS

This is a very preliminary study of some important population characteristics such as population growth rates, sex ratios and male and female literacy levels of the cities of Maharashtra based on the data furnished in Paper 1 of the 1991 Census of Maharashtra.

The study reveals that inspite of the low population growth rate within the municipal limits of Greater Bombay city, no dent seems to have been made in the urban concentration in Maharashtra, away from Bombay city. Most of the urban growth has taken place only in and around Bombay city particularly in the very close-by urban nodes of New Bombay, Thane, Kalyan, Mira Bhayander etc. Most of these centres serve only as centres of residential dispersion and woefully lack a strong infrastructural as well as economic base. Hence, inspite of the low population growth rate there is no sign of relief in bringing down the woes of the people of Bombay city.

Cities which are removed from this urban concentration continue to send out their males as shown by their high and increasing sex ratios. Many cities continue to have low levels of the literacy among both males and females. All this raises the question as to whether this type of urban planning, whereby urban nodes are developed very close to an exploding metropolis, particularly

as residential colonies, is desirable in the case of countries like India. Perhaps it is time to think of better alternative strategies of urban planning.

REFERENCES

1. Zachariah. K.C : *Migrants in Greater Bombay*. Asia Publishing House. Bombay. 1968
2. Narain. Vatsala and Gotpagar. K.B.. "Bombay and its in-migration". In Srinivasan K. and Mukerji S. (eds.). *Dynamics of Population and Family Welfare*. Himalaya Publishing House. Bombay. 1983.
3. Gupta. Kamala: "Migration to metropolitan cities in India" In Srinivasan K. and Mukerji S. (eds.). *Dynamics of Population and Family Welfare*. Himalaya Publishing House. Bombay. 1987.
4. Report of the National Commission or Urbanisation. Vol. II. p. 22. August 1988.

SOCIOECONOMIC DEVELOPMENT AND POPULATION GROWTH OF VARIOUS STATES IN INDIA : THE EXPERIENCE OF TWO DECADES

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and

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INTRODUCTION

The census results of a country like India, generally arouse interest about the socioeconomic consequences of population growth. How many more millions to feed and clothe, how many more schools and jobs? These are the concerns. However, the other side of the picture, in which development is viewed as one of the determinants of population growth, is equally important. From this point of view, it is interesting to examine the extent to which inter-state differentials in decadal population growth in India are related to inter-state differentials in socio-economic development at the beginning of the decade, and whether the relationship has changed in the course of time. Is there some evidence to indicate that states which started the decade with a higher level of social and economic development are also the states which experienced lower population growth rates during the decade?

The present paper proposes to examine this aspect for the decades 1971-81 and 1981-91 on the basis of the data for the last three censuses. The analysis is confined to the 14 major states of India and is based on the data available in Paper 1 of the 1991 Census of India [1], literacy data available from the 1971 and 1981 censuses of India, and basic statistics relating to the Indian economy[2]. In fact, the relationship is not so simple and direct, and unless we have statewise data on all the three components of population growth namely, fertility, mortality and migration we are not likely to get a clear picture.

The relationship between socioeconomic development and population growth is not always inverse as is usually believed to be. It depends on the stage of demographic transition as well as on whether the state is a net-inmigrating state or a net-outmigrating state. Better off states are likely to achieve faster reductions in both mortality and fertility but they are also likely to attract more inmigrants from other states. The final outcome is likely to depend on the relative strength of the effect of development on each of these three

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components. If the threshold of development is not enough to bring down fertility but is adequate enough to reduce mortality substantially and to attract migrants, one can get a positive relationship between development indicators and population growth. On the other hand, if the threshold of development is high enough to reduce fertility substantially, it can reduce the positive effect on population growth due to mortality reduction. A higher level of development then does not necessarily mean population growth at a lower rate. It also depends on the volume of net inmigration, caused by employment opportunities and other pull factors prevalent in the more developed states.

POPULATION GROWTH IN DIFFERENT STATES

During the decade 1981-91, the growth rates of the states were in the range of 13.98 to 28.07 per cent, while in the earlier decade they were in the range of 17.50 to 32.97 per cent (Table 1).

TABLE 1

Decadal population growth rates of various states in India, 1971-81 and 1981-91

State	Per cent growth	
	1971-81	1981-91
Andhra Pradesh	23.10 (11)	23.82 (7)
Bihar	24.06 (8)	23.49 (8)
Gujarat	27.67 (3)	20.80 (9)
Haryana	28.75 (2)	26.28 (3)
Karnataka	26.75 (4)	20.69 (10)
Kerala	19.24 (13)	13.98 (14)
Madhya Pradesh	25.27 (6)	26.75 (2)
Maharashtra	24.54 (7)	25.36 (5)
Orissa	20.17 (12)	19.50 (12)
Punjab	23.89 (9)	20.56 (11)
Rajasthan	32.97 (1)	28.07 (1)
Tamil Nadu	17.50 (14)	14.94 (13)
Uttar Pradesh	25.49 (5)	25.16 (4)
West Bengal	23.17 (10)	24.55 (6)
INDIA	24.66	23.50

Figures in brackets indicate the rank

In all the states except Andhra Pradesh, Madhya Pradesh, Maharashtra and West Bengal, the growth rates in the decade 1981-91 were lower than those in the previous decade. The decline is substantial in Gujarat, Kerala and Karnataka. In both the decades, Rajasthan had the maximum population

growth rate while Kerala and Tamil Nadu had the lowest rates. When ranked in the descending order of growth rate, Andhra Pradesh, Madhya Pradesh and West Bengal, ranked lower during 1981-91, indicating a relatively faster growth compared to the previous decade while Gujarat and Karnataka ranked higher indicating that in these two states, the population was growing relatively less fast.

ECONOMIC DEVELOPMENT INDICATORS AND POPULATION GROWTH

The states were divided into three groups based on the value of each developmental indicator at the beginning of the decade—taking the maximum and minimum values, the range was divided into three equal groups. Then the 'high', 'medium' and 'low' categories of each indicator at the beginning of the decade were cross-classified by the 'high', 'medium' and 'low' categories of the population growth rate during that decade.

Per Capita State Domestic Product

Tables 2a and 2b present the relationship between the per capita state domestic product (SDP) and population growth rate of the different states.

TABLE 2 (a)

Population growth rate (1971-81) of states in India by per capita state domestic product (1971)

Per capita SDP, 1971 (in Rs.)	Population growth rate, 1971-81 'High' (27.82-32.97)	'Medium' (22.66-27.82)	'Low' (17.50-22.66)
'High' (848-1070)	Haryana	Punjab	
'Medium' (625-848)	Rajasthan	Gujarat Karnataka Maharashtra West Bengal	
'Low' (402-625)		Andhra Pradesh Bihar Madhya Pradesh Uttar Pradesh	Kerala Tamil Nadu Orissa

TABLE 2 (b)

Population growth rate (1981-91) of states in India by per capita state domestic product (1981)

Per capita SDP, 1981 (in Rs.)	Population growth rate, 1981-91 'High' (23.38-28.07)	'Medium' (18.68-23.38)	'Low' (13.98-18.68)
'High' (1049-1354)	Haryana	Punjab	
'Medium (745-1049	Maharashtra West Bengal	Gujarat	
'Low' (441-745)	Bihar Andhra Pradesh Rajasthan Madhya Pradesh Uttar Pradesh	Karnataka Orissa	Kerala Tamil Nadu

If the expected inverse relationship is to hold true, the majority of the states should be on the diagonal shown by the dotted line. However, during both the decades, Haryana had a 'high' population growth rate inspite of having a 'high' per capita SDP at the beginning of the decade. Similarly, during both the decades, states like Kerala and Tamil Nadu did not have a 'high' population growth rate inspite of exhibiting a 'low' per capita SDP at the beginning of the decade. Gujarat was in the 'medium' category in both respects during both the decades. In short, there is no evidence of an inverse relationship. The only difference is that during 1971-81, half of the states fell into the category of 'medium' growth rate irrespective of the difference in the level of per capita SDP, while during 1981-91, half the states were in the 'high' population growth rate category irrespective of differences in the level of per capita SDP in 1981.

Population below the Poverty Line

It is generally argued that more than the level of per capita income, it is the income distribution aspect which is more relevant in the context of population growth. If the gains of development are shared by large sections of the population, it helps to accelerate the process of demographic transition and bring down the growth rate. By this logic, there should be a positive relationship between the percentage of population below the poverty line and population growth rate. Table 3 reveals that out of the fourteen states, five states as expected were in the 'high' category of both percentage of

population below the poverty line in 1981 and a 'high' population growth rate during 1981-91. As seen from Tables 2b and 3 there are extremes.

TABLE 3

Population growth rate(1981-91) of states in India by the percentage of population below the poverty line in 1981

Percentage of population below the poverty line (1981)	Population growth rate, 1981-91		
	'High' (23.38-28.07)	'Medium' (18.68-23.38)	'Low' (13.98-18.68)
'High' (40.8-53.9)	Bihar Madhya Pradesh Maharashtra Uttar Pradesh West Bengal	Karnataka Orissa	Tamil Nadu
'Medium' (27.7-40.8)	Andhra Pradesh Rajasthan	Gujarat	Kerala
'Low (14.6-27.7)	Haryana	Punjab	

1. Haryana seems to be fortunate to start the decade favourably in both respects, that is, with a 'high' per capita SDP and a 'low' percentage of population below the poverty line. Inspite of this, it falls in the 'high' category of population growth rate during 1981-91.

2. On the other hand, Tamil Nadu in a way, started the decade with the worst situation, that is a 'low' per capita SDP and a 'high' percentage of population below the poverty line. Yet, surprisingly, during the decade 1981-91, it is in the 'low' category of population growth rate.

3. Gujarat is moderate in all the three respects.

4. It is not surprising that Bihar, Madhya Pradesh and Uttar Pradesh are in the category of 'high' population growth rate during 1981-91 because they started the decade with a 'low' per capita income as well as a 'high' percentage of population below the poverty line. However, what is rather surprising is that West Bengal and Maharashtra, the two more advanced industrialised states have recorded 'high' population growth rates, inspite of starting the decade with better income levels ('medium' category in Table 2b). Perhaps the reason is that in both these states, the percentage of population below the poverty line is 'high'. However, nothing can be said conclusively unless migration data are released.

In short, both the economic indicators (per capita SDP and per cent of

population below the poverty line) do not reveal clearcut effects in the expected direction that is, a negative effect of SDP and a positive effect of the poverty indicator on population growth rate. Irrespective of the level of economic development at the beginning of the decade, the majority of the states are concentrated in the 'high' category of population growth rate during 1981-91.

SOCIAL DEVELOPMENT AND POPULATION GROWTH

Female literacy is one indicator which reveals to a large extent, the status of women, which consitutes a crucial aspect of the process of social development. In many demographic studies it has been observed that female literacy always emerges as the most important variable with a negative effect on both fertility and mortality. From this point of view, in Tables 4a and 4b most of the states should be on the path indicated by the dotted lines.

TABLE 4 (a)

Population growth rate (1971-81) of the states in India by female literacy rate (1971)

Female literacy rate, 1971	Population growth rate, 1971-81		
	'High' (27.82-32.97)	'Medium' (22.66-27.82)	'Low' (17.50-22.66)
'High' 20.72-26.86		Gujarat Maharashtra Karnataka Punjab West Bengal	Kerala Tamil Nadu
'Medium' 14.59-20.72	Haryana	Andhra Pradesh	
'Low' 8.46-14.59	Rajasthan Uttar Pradesh	Bihar	Orissa

As compared to 1971-81, the decade 1981-91 witnessed an inverse effect of female literacy on population growth rate more clearly (Table 4a). All the states in the 'low' category of female literacy in 1981 experienced a 'high' growth rate during 1981-91. However, all the states with 'high' female literacy did not uniformly indicate a 'low' population growth rate, for example, Maharashtra and West Bengal inspite of their 'high' literacy rate in 1981, experienced 'high' population growth during 1981-91. The role of net inmigration seems to be the obvious reason. However, a rapid decline in mortality not accompanied by an equally rapid decline in fertility is also likely to be responsible to some extent.

TABLE 4 (b)

Population growth rate (1981-91) of states in India by female literacy rate (1991)

Female literacy rate, 1981	Population growth rate, 1971-81		
	'High' (23.38-28.07)	'Medium' (16.68-23.38)	'Low (13.98-18.68)
'High' 26.68-35.00	Maharashtra West Bengal	Gujarat Karnataka Punjab	Kerala Tamil Nadu
'Medium' 18.36-26.68	Andhra Pradesh Haryana	Orissa	
'Low' 10.04-18.36	Bihar Madhya Pradesh Rajasthan Uttar Pradesh		

RELATIVE EFFECT OF ECONOMIC AND SOCIAL DEVELOPMENT ON POPULATION GROWTH

When zero order correlations were examined, the 1971-81 population growth rate showed a statistically significant negative relation only with the 1971 female literacy rate; its relationship with the 1971 per capita SDP and with the percentage of workers engaged in the industrial sector (1971) was not statistically significant.

However, the population growth rate during 1981-91 was found to bear a statistically significant negative relationship with both female literacy rate (1981) and percentage of workers engaged in the industrial sector (1981). Both the 1971-81 and 1981-91 population growth rates were found to be positively correlated with the per capita SDP level at the beginning of the decade but in both the cases, the relationship was not statistically significant.

Simple regression analysis revealed that only about 7.5 per cent of the variability in the 1971-81 population growth rate is explained by the 1971 per capita SDP (R^2=.07499). However, nearly 26 per cent of the variability in the population growth rate during 1971-81 is explained by female literacy (1971) alone (R^2=.26339). If both the variables (per capita SDP and female literacy rate 1971) are used in regression, they together explain nearly 45 per cent of the variability in the population growth rate during 1971-81.

If similar regression analysis is carried out for the decade 1981-91, almost no variability in the population growth during 1981-91 is explained by the per capita SDP (1981) (R^2 = .00028). However, the female literacy rate (1981) alone explains about 56 per cent of the variability in population growth

during 1981-91 (R^2 = .56283). If both the variables are considered, the together explain about 63 per cent of the variability. This clearly shows th compared to the 1971-81 decade, the social development indicators in th 1981-91 decade are far more important in explaining the variability in popul tion growth. The larger percentage of variability explained by the two variable together in 1981-91 indicates that in this decade the interaction between soci development and economic development is also more important than economi development alone. This certainly has implications in terms of the need fo policies to strengthen the social aspects of development, especially the statu of women.

SUMMARY AND CONCLUSION

In this short paper, the relationship between the level of socio-economi development at the beginning of the decade and the population growth ex perienced during the two decades 1971-81 and 1981-91 are discussed fo the fourteen major states of India. The values of indicators like per capit state domestic product, percentage of population below the poverty line, an the female literacy rate at the beginning of each decade as related to the popula tion growth rates in the following decade were examined for this purpose The cross-tables and regression analysis show that as compared to 1971-81 in the decade 1981-91, the social aspects of development played a more im portant role than the economic ones in explaining the variability in popula tion growth rates. Of course, the relationship will become more clear onl after the state-wise data required for obtaining the three components of popula tion growth are released.

REFERENCES

1. Registrar General, India: *Census of India: Provisional Population Totals*, Series 1, India Paper I of 1991, Office of the Registrar General, New Delhi, 1991.
2. Centre for Monitoring Indian Economy: *Basic Statistics Relating to Indian Economy - States*. Vol. 2. Centre for Monitoring Indian Economy, Bombay, 1988.

DYNAMICS OF POPULATION CHANGE IN INDIA: LESSONS FROM THE 1991 CENSUS

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INTRODUCTION

The 1991 census of India indicates that there are many challenges facing the country. The results of this census were not as surprising as were those of the 1981 census. Possible reasons are the high expectations from the family planning programme and its fertility impact in the decade of the seventies, and the availability of up-to-date information on India's population dynamics due to the speedy and regular publication of annual SRS data on fertility and mortality.

While 135 million people were added during the 1971-81 decade, the decadal increase in population during 1981-91 reached 161 million. Though the high rate of growth of population is in itself a serious problem, when coupled with the large size of the population, it becomes a matter of great anxiety. There is no longer any doubt that India's population will reach the one billion mark by 2001. To maintain a similar absolute change of 161 million during the 1991-2001 decade which would give a population of one billion, the inter-censal annual growth would have to be around 1.75 per cent, which will require a much higher acceptance of family planning by eligible couples to bring down fertility.

Despite the high and stable growth rate especially after 1961, India's population during the last 40 years (1950-1990), has not grown faster than that of other countries in the region. During the so-called population explosion stage of demographic transition, the growth rate of India's population could have been still higher but for the comparatively slower decline in mortality. This slower growth of population has been shown in Table 1.

While India experienced on average, a slower growth rate during 1950-90, in the 1980s, the annual growth rate was comparatively higher. While the crude death rate has reached a low and stable level and fertility has declined much faster during the 1980s in countries like Indonesia, Phillipines, Thailand and Malaysia, in India, both fertility and mortality have declined at the same pace leading to a constant growth rate.

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The watershed of India's demographic transition is spatial variation in population growth. Therefore, the analysis of growth patterns at the state level during 1951-91 should indicate the prospects of national growth dynamics. In addition to the continuing higher growth rate, the 1991 census has indicated a decline in the sex ratio from the 1981 level. Though the results are only provisional, the issue has to be considered judiciously. An attempt has been made here to examine the likely level of the sex ratio in view of the SRS mortality differentials for 1981-85 and 1986-87 which are available to us in addition to examining the growth patterns of the population.

TABLE 1

Growth rate of some selected Asian countries, 1950-90

Country	Percent increase 1950-90	Annual exponential growth rate (percent)	
		1950-90	1985-90**
India*	134.9	2.12	2.10
Indonesia	144.2	2.23	1.80
Pakistan	236.4	3.03	2.90
Bangladesh	184.9	2.62	2.70
Philippines	197.4	2.72	2.30
Thailand	178.4	2.56	1.40
Malaysia	189.2	2.65	2.30
China	104.6	1.79	1.30

Source: U.N. 1991, The Sex and Age Distributions of Population, The 1990 Revision (Medium Variatn) Department of International Economic and Social Affairs, New York.

* For India, Census Population for 1951 and 1991 are taken.

** Projected by U.N. Population Division of the Department of International Economic and Social Affairs, 1990, New York.

GROWTH DYNAMICS

The percentage decadal increase after 1951 for India and major states is given in Table 2. It is observed that the decadal increase for India levelled off during 1971-81 as of the earlier decade. The plateau in the growth rate experienced during 1961-81 seems to have continued during 1981-91 though the provisional results indicate a slight decline in decadal change. But looking into mortality differentials by sex during 1981-87 provided by the SRS and sex ratio of 1991, it seems that females have been under-enumerated to a comparatively greater extent (about six million if male enumeration is correct). If the 1991 population is adjusted for this under-enumeration, the decadal change for 1981-91 would work out to 24.60 per cent which is the same as that observed in the two earlier decades. In case males are also

considered to be under-enumerated, the growth rate may even indicate an upward trend. Nevertheless, India seems to have remained in the explosive stage of demographic transition for the last 30 years and there is no hope of a quantum reduction in the 1990s as the crude death rate is still over 10 per 1000 persons.

At the state level, the growth rate is affected by internal migration in addition to natural increase. It is however, observed that of all the major states only the four states of Bihar, Haryana, Maharashtra and Uttar Pradesh have a net migration rate of over one per cent. So, for most of the states migration may not be an important component of population growth.

TABLE 2

Pattern of population growth over time since 1951, India and major States

Area	Decade percentage increase			
	'51-61	1961-71	1971-81	1981-91*
India	21.51	24.80	24.66	23.50
Andhra Pradesh	15.65	20.90	23.10	23.82
Assam	34.98	34.95	23.36	23.58
Bihar	19.76	21.33	24.06	23.49
Gujarat	26.88	29.39	27.67	20.80
Haryana	33.79	32,23	28.75	26.28
Karnataka	21.57	24.22	26.75	20.69
Kerala	24.76	26.29	19.24	13.98
Madhya Pradesh	24.17	28.67	25.27	26.75
Maharashtra	23.60	27.45	24.54	25.36
Orissa	19.82	20.05	20.17	19.50
Punjab	21.56	21.70	23.89	20.26
Rajasthan	26.20	27.83	32.97	28.07
Tamil Nadu	11.85	22.30	17.50	14.94
Uttar Pradesh	16.66	19.78	25.49	25.16
West Bengal	32.80	26.87	23.17	24.55

Source: Census of India, Series-1, Provisional Population Totals Paper-1 of 1991, R.G. Office, GOI, New Delhi.

* With provisional figure of 1991.

Table 2 also indicates that five states—Gujarat, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu experienced a maximum growth rate during 1961-71. Of these, only three, namely Gujarat in the 1980s, and Kerala and Tamil Nadu, experienced a decline in the growth rate during the 1970s. It appears that Kerala experienced a plateau for a period of 20 years (1951-71) and Gujarat, for 30 years (1951-81) prior to experiencing a decline in their population growth rate, while Tamil Nadu has not experienced one in its

growth history. The other two states of Madhya Pradesh and Maharashtra have continued to exhibit growth rates around the level-off point (about 25 per cent decadal increase). Madhya Pradesh may continue to grow as its crude death rate is quite high. There are six states (Bihar, Karnataka, Orissa, Punjab, Rajasthan and Uttar Pradesh) which had a maximum growth rate during 1971-81; it is likely that these states may follow the plateau duration experienced by Gujarat or Madhya Pradesh and Maharashtra and hence their growth rate would probably continue to prevail during the next two decades. Karnataka and Punjab may be an exception in this group. The growth rate of Haryana may be difficult to predict. On the other hand, the growth rates of Andhra Pradesh and West Bengal have shown an upward trend but may not increase further. Therefore, the growth rate in the seven states—Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal—is most likely to continue. In fact, we may visualise an increase in natural increase for Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh which comprise 46 per cent of India's population because of the faster decline in their crude death rate which is around 13 at present.

Changes in the growth dynamics of states may also be examined along with the natural increase during 1981-91. However, we have data on natural increase only for 1980-82 and 1986-88. The figures are available for 1988 but due to yearly fluctuations in SRS annual rates, we prefer to take the average of the rates for three years. The natural increase and expected population are given in Table 3.

TABLE 3

Natural increase in 1980's and projected population, India and major States

Area	Natural increase[1] (%) 1980-82	Natural increase[1] (%) 1986-87	Expected pop. in 1991 (million)	Enumerated popn.[2] 1991 (million)
India	2.15	2.11	84.8	84.4
Andhra Pradesh	2.04	1.97	65.5	66.3
Bihar	2.38	2.37	88.7	86.3
Gujarat	2.28	2.04	42.3	41.2
Haryana	2.62	2.54	16.7	16.3
Karnataka	1.86	2.02	45.4	44.8
Kerala	1.95	1.53	30.1	29.0
Madhya Pradesh	2.21	2.31	64.1	66.1
Maharashtra	1.97	2.09	77.3	78.7
Orissa	1.92	1.90	31.9	31.5
Punjab	2.14	2.04	20.6	20.2
Rajasthan	2.46	2.25	4.37	43.9
Tamil Nadu	1.64	1.40	55.4	55.6
Uttar Pradesh	2.32	2.34	139.4	138.8
West Bengal	2.16	2.10	67.2	68.0

* Provisional.

Source: 1. Sample registration bulletin, 1988, R.G. Office, GOI, New Delhi. 2. Same as Table 1

The expected populations are estimated upto 1987 using the observed natural increase and for the next four years using extrapolated values of natural increase based on recent changes. The expected population for India is higher by four million compared to the enumerated population. Table 3 may be summarised as:

Decline in natural increaseL (per cent points)	Increase in natural increase (per cent points)	Stable natural increase (diff. less than 0.02 per cent points)
Andhra Pradesh (.07)	Assam (.08)	Bihar
Gujarat (.24)	Karnataka (.16)	Orissa
Haryana (.08)	Madhya Pradesh (.10)	Uttar Pradesh
Kerala (42)	Maharashtra (12)	
Punjab (.10)		
Rajasthan (21)		
Tamil Nadu (.24)		
West Bengal (.06)		

It may be noticed from the above table that a real change in natural increase has taken place only in Gujarat, Kerala, Punjab, Rajasthan and Tamil Nadu. Rajasthan is an unexpected state in this group, the other three—Andhra Pradesh, Haryana and West Bengal may be clubbed with the third group. On the other hand, a noticeable upward increase in natural increase may be said to have occurred in Karnataka, Madhya Pradesh and Maharashtra; thus, Assam also joins the third group. This means that more than half of India's population experienced stability in natural increase during 1980-82 to 1986-88.

SEX RATIO

After each census, India's sex ratio has been a matter of debate as it continued to decline till 1971 right from the beginning of census-taking in India. The sex ratio which was 947 in 1951, declined to 930 in 1971, indicated an increase from 930 to 934 in 1981, but came down again to 929 in 1991; below the 1971 level. A drastic decrease of 11 females per 1000 males was observed during the period of 1961-71 which experienced a faster mortality transition.

The sex ratio is affected by three main factors:

i) Sex ratio at birth (SRB)
ii) Sex differentials in mortality
iii) Sex selective migration

In addition to these factors, age specific sex ratio may also be affected by age misreporting because the pattern of age misreporting is different for males and females.

At the national level, only the first two factors are important. In India, we do not have information about the sex ratio at birth though we assume it to be 105 male live births to 100 female births. If, over a period of time, the sex ratio at birth has been increasing in favour of males, it could have influenced the sex ratio of the population in the age groups 0-4 and 5-9. In fact, the sex ratio of these two age groups has recorded the highest decline after 1951; among the 0-4 and 5-9 age groups, the sex ratio declined from 990 in 1951 to 959 in 1981 and from 965 to 943 respectively.

In India, various studies have shown faster mortality improvements among females compared to males especially after 1966. The annual change in life expectancy (e°_{o}) estimated for different inter-censal periods is presented below:

Period	Annual change in e°_{o}		Difference (F-M)
	Male	Female	
1951-66	0.76	0.64	− 0.12
1966-76	0.58	0.61	+ 0.03
1976-86*	0.42	0.58	+ 0.16

SRS estimates

It appears that females were in a disadvantageous position during the early stage of mortality transition. But, since the late 1960s, the annual change in life expectancy has been higher among females so as to reach equality by 1980. During 1981-85, female life expectancy is observed to be slightly higher than male life expectancy. Faster improvement in mortality for females has been observed even in rural areas though the life expectancy for females remains lower than that for males. The change in the value of e°_{1} also indicates a similar trend as can be seen in the table below:

Mortality indicator	Annual change from 1970-75 to 1981-85					
	Rural		Urban		Combined	
	Male	Female	Male	Female	Male	Female
e°_{o}	0.46	0.59	0.25	0.45	0.45	0.61
e°_{1}	0.36	0.48	0.16	0.35	0.35	0.50

Thus the available data indicate a faster change in female life expectancy than that of males and it is likely that by 2001 this gap may further widen. The question that arises then is: despite the faster improvement in female life expectancy, why has the sex ratio declined during 1981-91? There can be two possible explanations. First, that mortality differentials by sex as indicated

by SRS data are not correct, or that females have been comparatively more under-enumerated than males.

There is no basis for questioning SRS data, and therefore the second alternative will have to be examined. For this, the 1981 sex ratio by age was projected to 1991 by taking five-year survival ratios for 1981-85 and 1986-87. Due to the non-availability of data, survival ratios for the period 1986-91 could not be taken. The results of this exercise are given in Table 4 along with age specific sex ratios from 1951 onwards. In addition to the expected sex ratios by age in 1991, this table can be used to examine the sex ratios by age cohort. An increase in the sex ratio of a particular age cohort compared to a younger one in the earlier census would indicate a higher survival ratio for females than for males provided age-misreporting is similar over censuses and by sex.

TABLE 4

Age-specific sex ratios, 1951-91, India

Age	1951	1961	1971	1981	1991*
0-4	990	977	958	959	953
5-9	965	966	938	943	942
10-14	936	949	924	909	941
15-19	944	943	938	912	940
20-24	969	948	961	947	904
25-29	959	949	969	969	905
30-34	927	928	955	962	939
35-39	897	890	916	942	967
40-44	876	872	873	913	964
45-49	884	867	847	885	957
50-54	902	870	844	986	942
55-59	936	890	868	898	923
60-64	979	934	894	939	927
65-69	1011	965	900	958	962
70*	1043	1147	940	977	1048
All Ages	947	941	930	934	938-941
10+	937	928	923	928	938

* Projected sex ratios by using SRS life table survivorships for 1981-85 and 1986-87.
Source : Age Table for Respective Census, Census of India, R.G. Office GOI, New Delhi.

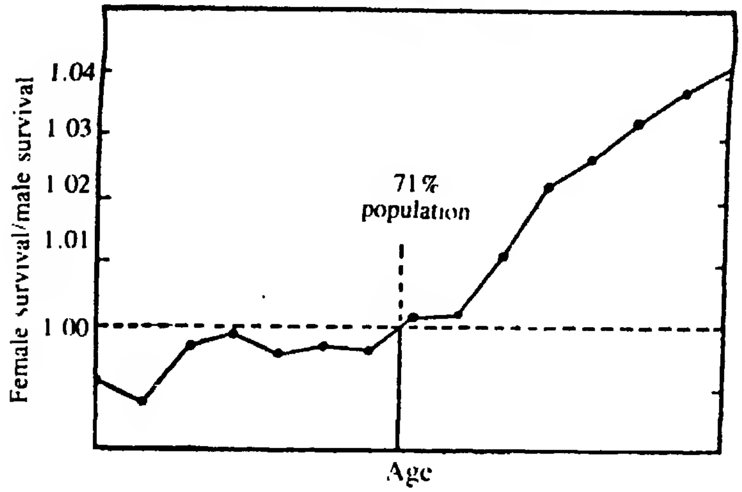
The ratios of five-year female survival to male survival (FS/MS) for 1981-85 and 1986-87 illustrated in Figure 1 indicate that though females are better off than males in respect of life expectancy, in about 70 per cent of the population (below age 35) females have a lower probability of survival compared to males. This difference determines the level of the overall sex ratio. For a balanced or favourable female sex ratio, there would be large dif-

ference in e^o_o (probably 5-6 years).

Figure 1

Ratio of 5-year survival for female to male survival, India

SRP Life Table 1096-87



SRS Life Table 1981-85

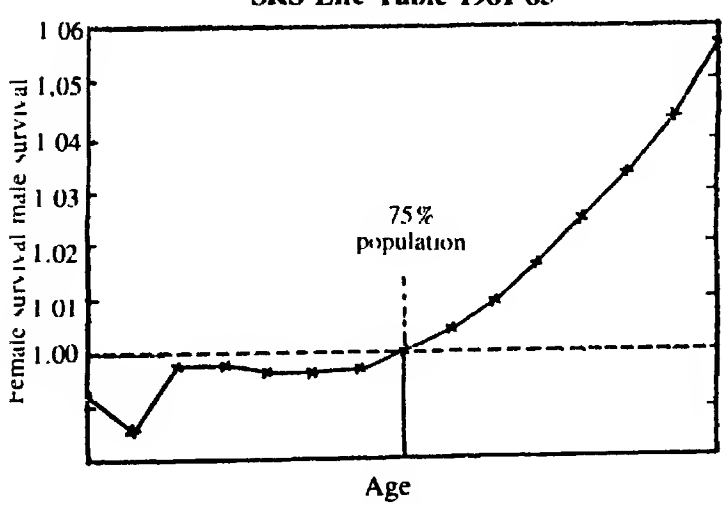


Table 4 also indicates that the projected sex ratio works out to 938 for the population aged 10 years and above. Also, the sex ratio for the population aged 0-9 was never lower than 940. In fact, the sex ratio as recorded in the 1981 census and the projected 1991 population is 948 in the 0-9 age group, suggesting that the sex ratio in 1991 should not have been below 938 under any condition. The weighted average of sex ratios for the age groups 0-9 and 10+ would work out to 941 (.256x948 + .744x938). This may be taken as the upper limit of the sex ratio in 1991. Under this argument and assuming male enumeration to be correct, under-enumeration for females may range from 4.1 to 5.5 million. This itself leads to a population of about 848 (see Table 3) to 850 million in 1991 with an annual growth rate between

2.16 to 2.18 during 1981-91. This is the lowest estimate of growth rate as the male population would also be under-enumerated.

The low sex ratio may also be explained taking its spatial distribution. The sex ratio at the state level is not significantly affected by migration except in the case of Bihar, Haryana, Maharashtra and Uttar Pradesh, where the net migration rate during 1971-81 exceeded one per cent. Migration rates are not likely to change drastically during 1981-91. Thus, even at the state level, mortality differentials play an important role.

Table 5 provides state level sex ratios for 1981 nd 1991, the migration status as of 1971-81, and mortality differentials e(f)) e(m) as of 1981-85. It will be more prudent to single out Bihar where the sex ratio has declined by 34 per 1000 males during 1981-91. The results for Bihar need to be looked into because with similar mortality differentials, Uttar Pradesh has experienced a decline of only three females per 1000 males. The sex ratio is still much higher in Bihar compared to Uttar Pradesh.

TABLE 5

Sex ratio, migration status, 1971-81 and mortality differentials, 1981-85 by states

State	Sex ratio 1981	(F/M)[1] 1991*	Difference	Migration status losing or gaining)	Difference[2] e_o^o (f) m
Andhra Pradesh	975	972	− 3	L	+2.6
Assam	910	925	+15	—	−0.1
Bihar	946	912	−34	L	−2.7
Gujarat	942	936	− 6	G	+3.8
Haryana	870	874	+ 4	G(M) L(F)	−2.5
Karnataka	963	960	− 3	G	+2.3
Kerala	1032	1040	+ 8	L	+6.1
Madhya Pradesh	941	932	− 9	L	+0.4
Maharashtra	937	936	− 1	G	+2.5
Orissa	981	972	− 9	G	−0.1
Punjab	879	888	+ 9	G(M) L(F)	+1.0
Rajasthan	919	913	− 6	G	+ 0.5
Tamil Nadu	977	972	− 5	L	+09
Uttar Pradesh	885	882	− 3	L	−2.9
West Bengal	911	917	+ 6	G	+1.2

* Provisional.

Source: 1. Same as Table 1.

2. R.G. 1989, SRS Based Abridged Life Tables 1981-85, Occasional Paper No. 1 of 1989, R.G. Office, GOI, New Delhi.

Of the 15 major states, five states namely Assam, Haryana, Kerala, Punjab and West Bengal have recorded increases in sex ratio. Notably, Kerala, Punjab and West Bengal have higher female than male life expectancy by more than

a year. Table 5 shows that Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu have recorded a decline in the sex ratio without recording any substantial differences in the life expectancy of males or females, while differences of more than two years are observed for Andhra Pradesh, Gujarat, Karanataka and Maharashtra. In Uttar Pradesh and Haryana, female life expectancy is lower than male life expectancy by almost three years. But in Haryana, the sex ratio has increased and in Uttar Pradesh it has declined. It seems that for Bihar, Haryana, Maharashtra and Uttar Pradesh one has to look into the migration data for 1981-91 to explain the sex ratio as mortality differentials of 1981-85 alone cannot explain the changes.

CONCLUDING REMARKS

The results of the 1991 census were not taken with great surprise as were those of the 1981 census. An analysis of growth patterns during 1951-91 indicates a continuity in the growth rate at the level observed in 1961-71—above two per cent, which is most likely to continue during the present decade; India's population will reach the billion mark by 2001. An analysis of growth dynamics at the state level reveals the following points:

1. The growth rate of Gujarat, Kerala, Punjab and Tamil Nadu may decline further. Karnataka and Maharashtra which have experienced an increase in natural growth may join these states during 1991-2001.
2. The growth rate observed during 1971-91 in seven states - Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal is likely to continue at least until 2001, if not beyond.
3. Natural increase has been nearly stable in the states of Andhra Pradesh, Assam, Bihar, Haryana, Orissa, Uttar Pradesh and West Bengal. There is likelihood of an increase in the natural increase in most of the northern states including Assam and Orissa.

From the examination of the 1991 census and auxiliary information, it is abundantly clear that the female population has been under-enumerated to a greater extent than the male population. If the male population is assumed to be correctly enumerated, under-enumeration of females would range between 4 to 6 million, and India's population would seem to have surpassed 850 million. This also gives an annual growth rate in the range of 2.16-2.18 per cent during 1981-91. The sex ratio would be somewhere between 938-941.

The ratio of five-year female survival to male survival indicates that despite a slightly higher female life expectancy, females below age 35 experienced lower survival chances compared to males during 1981-87. This is a combined manifestation of social custom and economic status determining the overall status of women. For faster improvements in the sex ratio, efforts have to be made to improve the health status of females in the states of Bihar and Uttar Pradesh where female life expectancy is lower by 2.5 and 2.9 years respectively.

SOME OBSERVATIONS ON THE 1991 CENSUS POPULATION OF INDIA

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and

DR. T.K. ROY**

INTRODUCTION

The 1991 census count of the population of India has, as usual, generated considerable interest in making a reappraisal of the population situation in the country. The enumerated total population of 843.9 million with 437.6 million males and 406.3 million females has thrown open certain issues. There has not been a perceptible decline in the growth rate of the population, its level being 2.11 per cent during 1981-91 as against 2.22 per eent in 1971-81. This has further questioned the impact of the country's family planning programme.

One big difference this time however, is that the magnitude of the population as revealed by the census was not beyond comprehension. The estimates of birth and death rates from the Sample Registration System (SRS) had suggested that the growth rate during the 1980s would be in the vicinity of 2.10 per cent. Also, the Standing Committee on Population Projections put the projected 1991 population of India at 843.6 million, only 0.3 million less than the census count[1]. Though the population count was not unexpected, the sex ratio was a surprise.

The sex ratio in India has always been a matter of concern. The anxiety has been both because of its low level as well as its continuously declining trend. Some optimism developed for the for the first time in 1981, when the trend in sex ratio showed a reversal. True, the increase in sex ratio from 930 in 1971 to 934 in 1981 was nothing striking, but it was just an indication of the beginning of a long awaited sex differential in mortality. Again, available data from the SRS also supported the optimism—it indicated a slow but steady improvement in sex differentials in mortality.

The shocking revelation of the 1991 census that the sex ratio has again taken a downward bend has given rise to the feeling that there has been an under-enumeration of the population, particularly of females. There was also a feeling that despite programmes directed towards the welfare of women, female mortality has not improved as expected. While it is difficult to specify the reality, which would be better perceived when the age distribution of

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the population becomes available, it is possible to have a closer look at the present situation. After all, we have the annual estimates of the vital rates provided by the SRS and the annual statistics on family planning performance to serve this purpose.

With the help of a few alternative population projections, the paper attempts to review the enumerated census population of 1991 in the perspective of the 1981 census and the various available demographic parameters during the decade.

METHODOLOGY

Starting with a sex-age distribution of the 1981 census and making alternate assumptions about the levels of fertility and mortality for the decade 1981-91, five sets of population projections were worked out. The first three sets are based on a simple cohort component method whereas the next two are based on a model developed at the Institute for setting family planning targets[2,3].

The net international migration for all the five projections is assumed to be negligible. The fertility and mortality assumptions for the first three sets of projections are based on the respective estimates as obtained from the SRS. The average age specific fertility rates (ASFR) for the period 1981-86 as obtained from the SRS have been inflated by 3 per cent in order to correct for the under-estimation in the crude birth rate as given by the Registrar General[4]. The corrected ASFRs have been incorporated into all the three sets of projections for the period 1981-86. For the next five-year period 1986-91, the ASFR estimates for the year 1987 have been used.

Projections I and III assume the sex ratio at birth to be 106 whereas Projection III assumes the sex ratio to be 110.

The estimates of life expectation at birth for males and females have been worked out on the basis of the SRS age specific death rates for the period 1981-86. The expectation of life at birth for males was assumed to increase by 0.5 years per year during the period 1986-91. In the case of females, a slightly higher increment in the expectation of life at birth of 0.55 years per year was considered.

However, Projection III assumes only male life expectancy for the period 1981-86 to be the same as that given by the SRS; levels of female mortality and increments in male and female life expectancy have been manipulated to match the 1991 sex distribution. Age patterns of mortality have been borrowed from the model South pattern of the United Nations Life Tables[5].

The fertility and mortality assumptions incorporated in the first three sets are presented in Table 1.

TABLE 1

Various fertility and mortality assumptions under Projections I and III

	Projection I		Projection II		Projection III	
	1981-86	1986-91	1981-86	1986-91	1981-86	1986-91
Total fertility rate	4.6	4.1	4.6	4.1	4.6	4.1
Expectation of life at birth						
Male	54.2	59.7	54.2	59.7	54.2	60.0
Female	54.4	59.9	54.4	59.9	53.2	57.2
Sex ratio at birth	106	106	110	110	106	106

For the next two sets of projections, the data requirement is comparatively high. The fertility data needed for the two sets are: proportions of married women by age, age specific marital fertility rates at the beginning of the projection period and family planning performance by age and method for the period 1981-1991.

Projection IV assumes the performance of sterilisation, IUD, conventional contraceptives and oral pills to be the same as that given in the official service statistics, while in Projection V, certain correction factors have been applied to these performance statistics—due to the large amount of wastage in the distribution of conventional contraceptives and oral pills, the distribution of these contraceptives through Government outlets has been ignored and only that though commercial channels has been considered. Further, sterilisation and IUD performance for the period 1981-91 has been deflated by 12.5 and 20 per cent respectively. Table 2 provides the input parameters for Projections IV and V.

TABLE 2

Mortality and family planning assumptions for Projections IV and V

	Projection IV		Projection V	
	1981-86	1986-91	1981-86	1986-91
Expectation of life at birth				
Male	54.2	59.7	54.2	60.0
Female	54.4	59.9	53.2	57.2
Family planning	As reported in service statistics		Ster.: 12.5% reduction IUD: 20.0% reduction CC: Commercial distribution OP: Commercial distribution	

RESULTS

The results of the first three sets of projections are presented in Table 3.

TABLE 3

Sex-age composition and decadal crude birth and death rates and growth rate by Projections I, II and III and Census/SRS

	Census		Projection		
	1981	1991	I	II	III
Total population (in '000)	684,617	843,931	847,424	847,437	843,884
Male	353,837	437,597	437,429	439,426	437,545
Female	330,780	406,333	409,996	408,011	406,339
Percentage age distribution					
0-14 years	39.7	N.A.	36.2	36.2	36.1
15-59 years	54.2	N.A.	57.3	57.3	57.5
60+ years	6.1	N.A.	6.5	6.5	6.4
Sex ratio (overall) (F/M x 1000)	935	929	937	929	929
Sex ratio by age					
0-9 years	950	N.A.	937	903	920
10-49 years	929	N.A.	932	932	934
50+ years	927	N.A.	938	938	919
Decadal					
Crude birth rate		32.6*	33.0	33.0	33.0
Crude death rate		11.4*	11.7	11.7	11.9
Growth rate		2.12*	2.13	2.13	2.11

* Estimates based on the SRS for the period 1981-1989.

Apart from the total population, the table provides the age distribution and sex ratios for selected broad age groups. For comparison, corresponding estimates from the 1981 census have also been presented. It may be mentioned that in all the three sets of projections, while the same assumption about fertility has been made, in respect of mortality, Projection III assumes a different level of female mortality. As a result of these assumptions, the age distribution as well as the vital rates obtained in all the three projections are similar. In Projection I, the sex ratio of the population is estimated as 937 females per 1000 males, whereas in Projections II and III it is 929 which coincides with the estimates obtained from the 1991 census. However, in Projection II, due to the assumption of a higher sex ratio at birth (110 male births per 100 female

births), the sex ratio of the child population (0-9 age) works out to 903. The lower level of overall as well as age specific sex ratios in Projection III are the result of a bigger gap between male and female life expectancy at birth.

TABLE 4

The results of Projections IV and V

	Projection IV	Projection V
Persons, 1991 (in thousands)	831,827	840,166
Males, 1991	429,335	435,833
Females, 1991	402,492	404,333
Sex ratio, 1991	937	928
CBR, 1981-91	31.0	32.8
CDR, 1981-91	11.6	12.2
CPR, 1991	42.9	35.0

According to Projection IV which assumes only the 1981 SRS level of fertility and family planning performance for the decade 1981-1990, the estimated crude birth rate is 31.0, about 2 points lower than the SRS estimate for the decade, whereas according to Projection V, in which family planning performance has been corrected for possible over-reporting, the birth rate for the decade 1981-91 works out to 32.8, almost the same as the corresponding estimate given by the SRS (Table 4).

DISCUSSION

The results of Projection I (Table 3) indicate that the estimate of the total population agrees quite well with the census estimate. The agreement in the estimated male population is even more complete, but the female population appears to have been under-estimated to an extent of about 3.66 million females.

The results of the projection suggest that the estimates of fertility and mortality for the decade provided by the SRS are in accordance with the population estimates in both the censuses. Such an agreement augurs well for the quality of data from both sources. It however, does not negate the possibility of under-enumeration in both the censuses. But, the degree of omission may not be very different. According to the post-enumeration checks applied for the 1981 census, the omission rates were 17.10 and 18.85 per thousand males and females respectively. If the census population is adjusted for possible omissions then, assuming a similar rate of omission and taking

into account an additional omission of 3.66 million females as indicated in the projection, the estimate of the total population in 1991 will be 862.7 million with 445.1 million males and 417.6 million females.

According to Projection I, the sex ratio of the population should have been 937, which would increase to 938 if we take into account the omission rates. In the absence of any net migration for the country as a whole, the sex ratio of the population might have been affected by one or more of the following three factors:

1. Sex selective under-enumeration of the population,
2. Sex selective mortality, and
3. Sex selective induced abortion affecting the sex ratio at birth

It is true that the effect of these factors on age specific sex ratios will be different. While the effect of sex selective induced abortion will get manifested only in the sex ratio of the 0-9 population, the other two factors will tend to affect the sex ratio at all ages. However, the effect of sex differentials in mortality will be more visible in the two extreme ages, that is, in the 0-9 and 50+ age groups. The effect of sex selective under-enumeration, if it can be attributed to the recent political upheaval in the country as indicated by Srinivasan (paper in this issue), will be reflected to a greater extent in the middle age group of 10-49 years.

The purpose of making Projections II and III was precisely to examine the effect of sex selective induced abortion and mortality on age specific sex ratios. Projection II, wherein the sex ratio at birth was manipulated to achieve an overall sex ratio of 929, shows that the sex ratio for the 0-9 age group will be as low as 903 females per thousand males. In Projection III which considers a slower improvement in the expectation of life at birth for females, the sex ratio declines substantially in the two extreme age groups.

A comparison of the age specific sex ratios of the 1991 census (when available) with those given in Projections I and III can provide some guidelines as to why the overall sex ratio was low. If the age specific sex ratios are closer to those obtained under Projection I, it would imply that the low sex ratio was more an artefact of the differential level of under-enumeration than anything else. An unusual drop in the sex ratio only in the 0-9 age group, would indicate sex selective induced abortion as the factor affecting the overall sex ratio. And, if the drop is observed in both the 0-9 and 50+ age groups, a more plausible explanation would be that the gap between male and female mortality has not narrowed over the years.

The results of Projection IV suggest that the family planning performance as given in the service statistics is over-reported. If the service statistics were reliable, the estimated 1991 population would have been less by about 12 million and the decadal birth rate would have been lower by about two points.

Even after heavy trimming of the performance data assumed in Projection V, the estimated population as well as the decadal birth rate fall short of the corresponding estimates given by the SRS. There are indications, however, of an increase in the natural fertility of the population. This can adversely affect the relationship between family planning performance and fertility. The couple protection rate of 35 per cent in 1991 as obtained by Projection V appears to provide a reasonable idea of the family planning performance in the country.

CONCLUSIONS

An attempt has been made in this paper to appraise the preliminary results of the 1991 census in the perspective of the 1981 census and the estimates of vital rates from the Sample Registration System. Five alternate sets of population projections for India for the period 1981-91 have been attempted which facilitate drawing our attention to the following points:

1. The enumeration of males in the 1991 census seems more complete than the enumeration of females. The projections suggest an undercount of 3.66 million females and place the estimated population at about 847 million. However, a clearer picture of the under-enumeration of females will be available only after information regarding population age distribution is released. Some guidelines have been indicated in this direction.
2. The quality of the estimates of fertility and mortality as obtained from the Sample Registration System for the period 1981-89 appears fairly reliable and agrees well with the estimated population of the 1981 and 1991 censuses. This suggests that the rate of omission, if any, may not be much different in the two censuses. If an omission rate of 1.710 per cent for males and 1.885 per cent for females, as observed in 1981 is assumed, the total population in 1991 will work out to 862.7 million.
3. Family planning service statistics are found to be over-reported to a considerable extent. A couple protection rate of 35 per cent in 1991 appears to provide a reasonable estimate of the family planning performance of the country.

REFERENCES

1. Standing Committee on Population Projections: Report of the Standing Committee of Experts on Population Projections, Planning Commission, Government of India, 1989.
2. Srinivasan, K., Roy, T.K. and Ghogale, Sulabha: *Family Planning Targets by States for India*, Vol. I, International Institute for Population Sciences, Bombay, 1980 (mimeographed).
3. Srinivasan, K. and Parasuraman, Sulabha: *Update on India's Family Planning Targets for the Future*, International Institute for Population Sciences, Bombay, 1985 (mimeographed).
4. Office of the Registrar General, India: *Report on Intensive Enquiry Conducted in a Subsample of SRS Units (1980-81)*, Occasional Paper No. 2 of 1983.
5. United Nations: *Model Life Tables for Developing Countries*, Department of International Economic and Social Affairs, Population Studies No. 77, 1982.

MIGRATION IN EASTERN INDIA : HOW MUCH OF IT IS ILLEGAL

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INTRODUCTION

Many demographers maintain that India is a net population-losing country, and estimates of migration, legal or illegal, have met with arguments such as the presence of a large number of Indians in the countries of the Gulf region, West Europe, South East Asia, North America etc., and the receipt of remittances from outside India to support the belief that the country loses more people than gains them through returnees. Moreover, migration tables have invariably shown a fair number of persons reporting their place of birth as being outside India.

Such arguments, however, do not consider two or three aspects namely, (1) an illegal migrant is not likely to report his or her correct place of birth, (2) no one knows how much money is sent from India through banking and other channels to countries like Nepal, Afghanistan, Bangladesh, Bhutan, etc. in spite of the rather low wages in India, and (3) distress migration to India from other countries is a historical fact. During the last several years, a large number of people from Tibet, Afghanistan, Bangladesh, Burma, Sri Lanka and even Pakistan have sought refuge in India, and no one really knows how many of them have stayed back.

An assessment of migration performed by way of direct questions asked during census enumeration will not give a true picture even if all Indian born respondents give correct responses to these questions. It is always advisable to examine a demographic parameter like population growth through different approaches. If the decadal growth of a country like India is large it does not necessarily mean that the family planning programme is a failure. The growth in different parts of the country should be examined in the context of at least two factors, namely, in-migration during the decade—both legal and illegal—and what percentage of births in each year have been of the first and second orders. If in-migration is large, and first and second order births are observed to be increasing, then rapid population growth cannot be considered as being due to a failure of the family planning programme. In this article, an effort has been made to assess the level of in-migration during the 1981-91 decade in India and in the ten states of eastern India.

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METHODOLOGY

The estimations involve the following steps:

1. The 1981-1991 inter-censal growth for each of the ten eastern states—Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Nagaland, Orissa, Tripura, West Bengal and the Union Territory of Andaman and Nicobar Islands, was computed by dividing the 1991 population with 1981 population and subtracting one from the result. The eastern state of Mizoram was not considered as vital rates for this state have not yet been published by the SRS.
2. For each year, namely 1985, 1986, 1987, 1988 and 1989, the rate (BR-DR/100) was computed from SRS data[1] for India and each of the ten states; and also for India less the state taken one at a time. (Such vital rates are available for earlier years, but as SRS samples were revised between 1982 and 1984 the starting point was taken as 1985). The maximum natural growth for each area was identified and assumed to hold for the entire decade for the area.
3. Second differences of the per cent natural growth and their second order raw moments were computed separately for the state, India, and India less the state. The square roots of the second raw moments were computed to represent standard deviations of errors in the natural decadal growth.
4. The decadal net migration rate for each area was computed from the equation:

   Migration rate = Decadal growth rate − Maximum of the natural growth rate (in step 2) − C $\pm$ sd of the error in natural growth (from step 3) ....(1)

In (1) all items, except 'C' are known. 'C' is a standard normal variable. The equations for estimating 'C' are derived from the identity:

Number of migrants for state + Number of migrants for India less the states = Number of migrants for India ......(2)

The ten equations for the ten states are given in equation (3) of the Appendix.

RESULTS

This approach tries to account for inter-censal growth through the maximum observed natural growth during the period 1985-1989 and errors in natural growth. To get an idea of the latter, the Variate Difference Method*

* Tintner recoomends the use of the second raw moments of the differences for computing the variance of the error component in a time series. His book provides tables to decide which order difference is free from the trend part. In this paper, since the series is short (only 5 observations), second differences are assumed to be free from the systematic part.

developed by Tintner[2] was applied. This assumes that the time series of natural growth has two components—a systematic part which can be represented by a polynomial in time and an error part. The second difference is a function of errors only if the systematic part is linear in time. The estimated migration rate and the volume of migration reported here are likely to be on the lower side. Table 1 presents the volume of decadal migration.

From Table 1, Column 1, it can be seen that only three states—Assam, Bihar and Orissa—have lost population due to migration during the 1981-1991 decade, and among these, the loss in Assam is nominal. The remaining seven eastern states have gained population through migration. The gains in Nagaland, Andaman and Nicobar Islands and Tripura are large.

TABLE 1

Net migration to India and ten eastern states, 1981-1991

	Number of migrants in the state	Number of migrants in the Rest of India	Number of migrants in India
Arunachal Pradesh	76,456 (8 91% of '91 pop)	5,105,542	5,180,998
Assam	– 2,767 (0 02% of '81 pop.)	5,183,778	5,181,011
Bihar	– 88,046 (0 13% of '81 pop.)	5,269,036	5,180,990
Manipur	69,320 (3 79% of '91 pop.)	5,111,680	5,181,000
Meghalaya	106,130 (6 03% of '91 pop.)	5,074,866	5,180,996
Nagaland	257,127 (21.15% of '91 pop.)	4,923,880	5,181,007
Orissa	– 65,421 (0 25% of '81 pop.)	5,246,477	5,181,056
Tripura	208,196 (7.59% of '91 pop.)	4,972,808	5,181,004
West Bengal	534,055 (0.79% of '91 pop.)	4,646,796	5,180,851
Andaman & Nicobar	44,054 (15.85% of '91 pop.)	5,136,964	5,181,018
All 10 States	1,139,104 (0.53% of '91 pop.)	5,067,708*	5,180,993*

Negative entries indicate net out-migration from the state.
* indicates the average of the ten areas.

The ten eastern states taken together gained 1.1 million people inspite of Assam, Bihar and Orissa together losing 156,234 persons. Since the rest of India as well as India both gained population during the decade, it may be concluded that there was significant illegal migration in the eastern Indian states. If the net losses of Assam, Bihar and Orissa are assumed to be a part of the net gains in the remaining seven states, the total gain in the seven Eastern states due to illegal migration alone could be as high as 1,295,338 persons. Of course, this assumes that returnees from the Gulf and other parts of the world who may account for a large part of the estimated net migration to India during 1981-91 (5.181 million), did not go to the seven eastern states.

Excluding the eastern states, the country gained 4,041,896 persons in the 1981-91 decade. It is doubtful if all of them can be accounted for in terns of returnees from the Gulf and other countries. At least two to three million people enumerated in 1991 are likely to be from our neighbouring countries, and to that extent the country's growth rate should be adjusted.

Under-enumeration is often mentioned as the cause behind the discrepancy between the enumerated population and the estimated population on the basis of natural growth. Errors in natural growth reinforce the feeling that fertility has not fallen sufficiently. Here we have made the maximum possible adjustments for natural growth and errors in it. In spite of such adjustments, the results show significant net in-migration. Errors due to omissions are likely to be greater for illegal entrance. Thus, estimation of both legal and illegal migration is essential before judging the performance of the national family planning programme.

REFERENCES

1. Tintner, G.: *The Variate Difference Method*, Bloomington Inc., USA.
2. US Bureau of Census: *Methods and Materials in Demography*, Vol. 2, Shryock, H.S. Siegal, J.S. and Associates, US Bureau of Census, Washington D.C. 1971.

APPENDIX

The rate and volume of migration during the 1981-91 decade for India, Arunachal Pradesh, and India less Arunachal Pradesh, are illustrated in the following paragraphs:

TABLE A

Estimated net migration rates

	(BR-DR)/100 (Natural growth rate)					SD from (2)	Rate of migration	Volume of migration
	1985	1986	1987	1988	1989			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
India	.210	.215	.213	.205	.203	.006351	.020028−.00635 C2	13,685,715−4,339,140 C2
Arunachal Pradesh	.2120	.2520	.2310	.2280	.2110	.037599	.106561−.037599 C1	67,329−23,756 C1
(India—Arunachal Pradesh)	.2100	.2150	.2130	.2050	.2030	.006351	.019914−.006351 C2	13,595,233−4,335,810C2

The natural growth rates in line 3 above are obtained as p * entry in line 2 + (1−p) entry in line 3 = entry in line 1.

Or, entry in line 3 = $\dfrac{\text{entry in line 1} - p * \text{entry in line 2,}}{1 - p}$ where

p = $\dfrac{\text{1986 population of Arunachal Pradesh}}{\text{1986 population of India}}$

The entry in column 6 = $[\frac{1}{3}\{(2\ \text{col.}2 - \text{col.}1 - \text{col.}3)^2 + (2\ \text{col.}3\quad \text{col.}2 - \text{col.}4)^2 + (2\ \text{col.}4 - \text{col.}3 - \text{col.}5)^2\}]^{1/2}$

The entry in column 7 = $\dfrac{\text{(Enumerated 1991 population of the region)}}{\text{(Enumerated 1981 population of the region)}} - (1) - \text{(Maximum of the entries in columns 1 to 5)} - (Ci \times \text{entry in column (6)})$

The entry in column 8 = Enumerated Population in 1981 × Column 7

The ten equations corresponding to equation (2) in the text are:

From	
Arunachal Pradesh/ROI/ India	4,339,140 Cs − 23,756 C11 − 4,335,810 C21 = 23,153
Assam/ROI/India	4,339,140 Cs − 230,333 C12 − 4,230,565 C22 = 65,011
Bihar/ROI/India	4,339,140 Cs − 1,506,523 C13 − 5,553,854 C23 = 1,378,348
Manipur/ROI/India	4,339,140 Cs 37,027 C14 − 4,351,938 C24 = −43,212
Meghalaya/ROI/India	4,339,140 Cs 70,920 C15 − 4,420,680 C25 = 77,093
Nagaland/ROI/India	4,339,140 Cs 20,624 C16 − 4,334,902 C26 = 17,556
Orissa/ROI/India	4,339,140 Cs 1,009,217 C17 − 4,549,440 C27 = 24,219
Tripura/ROI/India	4,339,140 Cs 15,410 C18 − 4,326,784 C28 = 16,709
West Bengal/ROI/India	4,339,140 Cs − 916,573 C19 − 6,713,776 C29 = 532,665
Andaman & Nicobar Islands/ROI/India	4,339,140 Cs − 12,427 C110 − 4,338,624 C210 =) 485

ROI = Rest of India

In equation (3), Cs is taken as 1.96. This means that the natural growth rate for India in the decade 1981-1991 was 0.215 + 1.96 × .006351 = .227. As the average death rate in 1981 to 1989 is 11.5 per 1000 population the assumption Cs = 1.96 will imply an average CBR of 34.24 per 1000 for the decade 1981-1991 as a whole. An average CBR at 34.24 for 1981-1991 is likely to be on the higher side and therefore, there is very little justification to take Cs greater than 1.96.

To solve for the remaining C_{1j} and C_{2j} numbering 20 we have adopted the following procedure:

(a) Compute C_{1j} and C_{2j} j = 1, ... 10
on the basis of National Growth Rate[3] Method. Also, compute C_{1j} and C_{2j} if the migration rates were zero in each case. This will indicate the direction in which C_{1j} and C_{2j} obtained through National Growth Rate method should be corrected if the objective is to hold the estimated net migration at the lowest.

(b) Estimate the variances of C_{1j} and C_{2j} obtained through the National Growth Rate method. For the 10 Eastern State of India the two variances work out to be 3.7122 for C_{1j} and 0.2087 for C_{2j}. Take C_{1j} as $\dfrac{a_j}{3.7122}$ and C_{2j} as $\dfrac{a_j}{.2087}$ in the ten equations of set (3). Solve for each a_j and substitute in column (8) of Table A to get the volume of Net Migration in the decade 1981-1991.

CENSUS OF INDIA 1991: MAHARASHTRA

DR. (MRS.) SUDHA DESHPANDE*

INTRODUCTION

The size and growth of our population, affects not only our quality of life but our very survival. What and how much we eat, drink and wear, what type of house we live in, and how crowdedly, and the quality of health care, education and employment our children can aspire to, are influenced directly and indirectly by the growth of population. The census then is an invaluable source of data for every section of our population—politicians, administrators, national and regional planners, environmentalists and ordinary men and women who are exhorted day in and day out to restrict their family to two children at most.

Paper I from the Directorate of Census Operations, Maharashtra, provides data on the size, growth, density, sex ratio and literacy of the population of Maharashtra state, at the district level[1]. The present paper is restricted to an analysis of these characteristics from the above-mentioned document which clearly reveal that Maharashtra though ahead of the Hindi-speaking belt, trails miles behind Kerala in its demographic performance.

GROWTH OF POPULATION AND SPATIAL DISTRIBUTION

Maharashtra's population increased by 25.4 per cent from 62.8 million in 1981 to 78.7 million in 1991. The state almost doubled its population in the three decades since 1961—a feat which had taken six decades to accomplish earlier. Relative to India's population which grew at 23.5 per cent in the eighties, the state's population increased faster, reversing the trend observed in the seventies when it grew slower than the population of the country as a whole. Despite this, the state retained its share of India's population at around 9 per cent and continued to be the third most populous state in 1991 as it was in 1981. Judged by the decennial rate of growth, Maharashtra ranked 13th in the seventies and nineth in the eighties among the fastest growing states of India. The state's poor performance hits the eye when we compare its growth with Tamil Nadu's (14.9 per cent) and Kerala's (13.9 per cent).

Maharashtra is divided into 30 districts. The three most populous of them—Greater Bombay, Pune and Thane—accounted for 26.1 per cent of the state's population in 1991 showing a marginal increase in spatial concentration over 1981 when their share stood at 25.2 per cent. The most

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populous district of Greater Bombay counted 9.9 million persons in 1991, about 13 times as many as the least populous Gadchiroli. The uneven spatial distribution within the state could be better indicated by its density. Compared with 55 persons to a square kilometre in Gadchiroli, 16.432 persons crowded every one of Bombay's 603 square kilometres. Per cent increases in district densities between 1981 and 1991 were neither related to their densities in the base year nor to their distance from Greater Bombay. The notable exception was Thane, the district adjoining Greater Bombay; the density in the former increased by nearly 56 per cent and in the latter, by 20 per cent.

Maharashtra was less densely populated than India both in 1981 and 1991. In the latter year, there were 267 persons per sq.km. in India and 256 in Maharashtra. These figures could be better appreciated in the context of the range of densities across 23 states with Kerala recording 747 and Nagaland, 73 persons to a square kilometre.

Within Maharashtra only five of the 30 districts were more densely populated than the state. In the eighties, a third of the districts grew faster and two-thirds slower than the state. The state is divided into six divisions, Konkan, Nasik, Pune, Aurangabad, Amravati and Nagpur. Six of the ten districts growing faster than the state belonged to the Aurangabad division. Amravati drew a blank, and the other four divisions included one each of the remaining four districts growing ahead of the state.

Thane grew the fastest recording a growth of 55.9 per cent and Sindhudurg the slowest, 6.4 per cent over 1981. Thane, growing at 46.1 per cent in the seventies, topped the growth table and Greater Bombay ranked second with a growth of 38.1 per cent. In the eighties, Thane retained its top position with an improved decennial growth and Greater Bombay slid down to the 22nd rank with a growth of 20.2 per cent, exactly equal to the increase it recorded between 1911 and 1921. Nine districts including Greater Bombay grew slower in 1981-1991 than in the preceding decade. The decline in Greater Bombay's decennial growth from 38.1 per cent to 20.2 per cent works out to 46.9 per cent, the highest recorded by any of the nine districts showing a relative decline.

The Registrar General had projected the population by districts for 1991[1]. It would be interesting to check the projections with the provisional population totals reported now by the Director of Census Operations, Maharashtra. The state's projected population was 75.3 million, 3.4 million below the provisional count of 78.7 million. The projected population tallies exactly with the provisional count in eleven districts and where the two do not tally, the provisional count exceeds projections by 0.2 million in eight and by 0.1 million in five districts. The projections for Greater Bombay and Thane deviate widely from the provisional count. The Census office had

projected Bombay's population at 10.5 million and Thane's, at 4.4 million. The provisional counts were 9.9 million and 5.2 million respectively. However, as every demographer would know, populations of districts prone to migration are difficult to project.

It would not be inappropriate here to record my reservations of the provisional population enumerated in Greater Bombay. I fear that Greater Bombay's population of 9.9 million is likely to be a gross undercount. Using the survival ratio method and the vital statistics method, Dr. Zachariah had estimated the contributions of natural increase and net migration in Greater Bombay's inter-censal population growth since the turn of the century till 1961. I have extended the analysis to the next two decades. The shares of the two components of growth do not show substantial variations from one decade to another, though the contribution of net migration is on the decline, as is natural for a city in its mature state of urbanisation. Natural increase contributed 52.3 per cent and net migration, 17.7 per cent, to the increase in Greater Bombay's population in the seventies. If the provisional count of 9.9 million is accepted, the contribution of natural increase would rise to 82.4 per cent and that of net migration would decline to 17.6 per cent. If the past is any guide, such wide variations in the course of a decade are unlikely. This is not to deny that the dizzy prices of land, the decline in employment in the organised sector in Bombay, and the industrial location policy of the state government banning new large and medium industries from Bombay, would not have diverted migrants to neighbouring Thane. What is disputed is the magnitude of the decline in the absolute volume of migration from 1.1 million in the seventies to a meager trickle of 0.3 million in the eighties.

SEX RATIO

It is difficult to interpret the changes in the country's sex ratios of 930, 934 and 929 reported by the census in 1971, 1981 and 1991 respectively. The sex ratio which gives the number of women for every thousand men in the population had declined in each successive decade from 1901 to 1971. The improvement in 1981 though marginal, warmed the cockles of many a feminist heart, more so because it was accompanied by an increase in the female life expectancy at birth. Assuming a greater improvement in the health of women in the eighties, the Committee of Experts on Population Projections projected the country's sex ratio as 941 in 1991. The provisional sex ratio of 929 for 1991 would then lead us to doubt either the extent of improvement in the health of women or the count of women, most probably both.

The sex ratio for Maharashtra was 930 in 1971, 937 in 1981 and 936 in 1991 The Expert Committee had projected it at 939. The improvement in women's health that the trend in sex ratio implied though not high enough

for Jyotiba Phule's soul to rest in peace is likely to be realistic compared to that shown by the national data.

Within the state, the sex ratio ranged from 1211 for Ratnagiri district to 820 for Greater Bombay. Women exceeded men in three other districts—Sindhudurg (1140), Satara (1035) and Raigarh (1011). The excess owes much to outmigration of men than to the superior health status of women in these districts. In contrast, the low sex ratios of Greater Bombay (820) and Thane (880) owe more to a preponderance of males among inmigrants than to neglect of women.

LITERACY

Earlier censuses have reported literacy rates for the population aged five years and above. In 1991, in keeping with international practice, the census has reported literacy rates for the population seven years of age or older. The results indicate that proportionately far more Maharashtrians than Indians are able to read and write a simple sentence. Thus, 74.8 per cent of the males and 50.5 per cent of the females in Maharashtra were literate. The corresponding national levels were 63.9 per cent and 39.4 per cent.

The state's literacy increased from 55.8 per cent in 1981 to 63.1 per cent in 1991 and India's, a little faster, from 43.6 per cent to 52.1 per cent. Literacy improved slower in the state than in the country for both males and females. In the state, the improvement in female literacy was more marked than that among males. This is true of the country too, because of the lower female literacy in 1981 both in India and in Maharashtra. Incidentally, the decline in sex ratio is not easily reconciled with improvements in female literacy in the country.

The tall claims of being progressive made by politicians and adminstrators in Maharashtra stand exposed in the field of literacy, when the literacy levels in the state are compared with those in Kerala where 94.5 per cent of the males and 86.9 per cent of the females, and consequently 90.6 per cent of the persons were literate in 1991.

The data on literacy do not enable one to derive the literacy rates for districts. Paper 1 informs us that literacy levels in 17 of the 30 districts were lower than the state average for 1991. A decade earlier, 19 districts had reported lower than average literacy for the state. This indicates the painfully slow progress of education in districts which were observed to be educationally backward in 1981. Jalgaon, which reported a literacy level above the state average in 1981 failed to keep it up and has slid below the 1991 state average. Further, while eleven districts had reported higher literacy levels than the state average in 1981, only nine did so in 1991.

A distribution of the districts by female literacy shows that 12 districts recorded above average literacy. It is a tautology but an instructive one, that

districts with high total literacy report higher female literacy. The Census paper reports for the first time, the number of literate men per 100 literate women. The ratio could serve as in index of gender based inequality in the distribution of an asset—a crude proxy for human capital. A higher ratio would indicate greater inequality and a ratio of unity, perfect equality. Classifying the districts into three classes—mildly unequal, moderately unequal and highly unequal—ten were found to belong to the first, fourteen to the second, and six to the third category. Of the ten districts in the first category, eight reported a higher literacy level than the state average, of the fourteen districts in the second category only two did so, and all the six the third category reported literacy levels below the state average.

Paper 1 of 1991 for Maharashtra gives us a bird's eye view of the demographic and social changes that occurred in the state during the last decade. Though the provisional total count for the state comes very close to that projected by the Office of the Registrar General for 1991, the gross under-enumeration of Greater Bombay's population would continue to mar the credibility of the total count. The reversal of the trend in the decennial increase between 1981-1991 over the previous decade and the near constant sex ratio do not permit us to be complacent about the progress of the family welfare and maternal and child health services in the state. Changes in literacy merely indicate the painfully slow progress of the state in the field of elementary education. The demographic and social indicators definitely do not befit a state which claims to be progressive both economically and socially.

REFERENCES

Director of Census, Maharashtra: *Census of Maharashtra by districts, 1991*, Office of the Director of Census, Maharashtra, Government of Maharashtra, 1991.

Registrar General, India: Series 1, Occasional Paper II of 1987, Office of the Registrar General, New Delhi, 1989.

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CONTENTS

DEMAND FOR CHILDREN AMONG RURAL FAMILIES: CHILDREN AS A CONSUMPTION UTILITY

DR. T. LAKSHMANASAMY*

INTRODUCTION

In recent years, fertility has become an important subject of inquiry for economists. The decision to have children and their number and timing involve trade-offs which constrain the purchase and consumption of durables and other household items vying for the family's scarce resources. Moreover, resources are spent on products and services used in the prevention of child birth and in childrearing. Both the bearing and rearing of children are costly activities; goods and services invested on children have to be purchased in the market by paying a price. In addition, the time of parents, particularly the mother's time, is an important input in childbearing and rearing, and has an opportunity cost. In return, parents derive pleasure from having their own children[1]. This is termed as 'benefits' or utility from children. Parents allocate their resources among various items which yield satisfaction, including the number of children, such that they derive the maximum satisfaction. This is a typical choice problem. Thus, the decision to have children can be fruitfully modelled as an outcome of optimising household production and consumption decision-making. In this process, important determinants of the demand for children are household income and the cost of children.

OBJECTIVES

This paper uses such an economic framework for analysing the household demand for children[2]. Supply side variables and contraception have not been included, as the main focus is on demand side factors. Since contraceptive use is mainly an intervening variable, the income level of the family determines its use. Also, its effects are captured by the education variable, as better educated women tend to use more contraception. The main purpose of this paper is to analyse the economic determinants of parental fertility decision, which have so far been regarded more as a subject for demographers and biologists. The primary justification for the application of a micro-economic framework to fertility analysis is that many studies in both developed and developing countries indicate that childbearing and rearing have economic consequences for families and that economic factors exert a considerable influence on a couple's reproductive decisions.

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METHODOLOGY

The theoretical framework used in this paper is that of the 'new home economics' or the 'household production function' approach developed by Becker[1,2] and Willis[3], where fertility is viewed as an economically constrained choice in which family income and price of children play important roles. Becker[1] proposed that children can be viewed as an economic good and that the demand for children be represented as a family decision process wherein the household chooses a family size that maximises satisfaction, given the relative prices of commodities, tastes and total income. In simplified terms, the household derives satisfaction from 'commodities' which are not purchased in the market, instead, they are produced within the family by combining the market-purchased goods and services and the time of the family members. Then, the family is treated as a producing unit; producing various kinds of benefits for its members. In the literature, consumption utility represents the pleasure derived from having one's own children. If a family has a greater number of children than other families, it implies that the family derives more pleasure from having more children. Thus, various indices of the number of children measure the consumption utility of children. In this study, we use both 'fertility' and 'demand for children' synonymously to mean family size.

The family utility function can be written as:

$$U = u\,(N,Q,Z) \qquad (1)$$

where N is quantity of children, Q is quality per child, and Z is other sources of satisfaction. Each 'commodity' is produced according to a household technology:

$$j = f\,(x_j,\ t_{ij})\quad j = N,Q,Z \qquad (2)$$
$$i = m,w$$

where x_j represents market-purchased goods and services and t_{ij}, the time input of the household members (husband and wife) that goes into the production of j. The production function implies that parents can increase their satisfaction by increasing the resources devoted to the production of each household commodity. Combining quality per child and the number of children, parents derive 'child services', a flow of services from children (C); i.e.

$$C = NQ = f\,(x_c,\ t_{mc},\ t_{wc}) \qquad (3)$$

However, the productive capacity of the family is limited by the total time and total income available. The income constraint can be written as:

$$Y = H + W_w L + V = \sum_{j=1}^{n} P_j X_j \qquad (4)$$

where Y is the lifetime money income, H is the husband's lifetime earnings, W_w is the average hourly wage rate of wife, L is the hours of work of the wife in the labour market, V is the non-labour earnings and P_i is the price of market-purchased goods and services used in household production. The time constraint of the wife can be written as:

$$T = L + t \tag{5}$$

where T is the wife's total available time and t is the wife's time available for home production[4]. It is assumed that children are intensive in mother's time and that the male's time is mostly spent on market earnings. Now, the cost of producing household commodities can be written as:

$$\pi_j = P_jX_j + W_it_{ij} \tag{6}$$

where j is the shadow price of a unit production of household commodities. Thus, the shadow price of children is a function of the prices of market goods and services used in the production process and the wage rates of household members. Generally, the husband's wage is equated with family income and the wife's wage is treated as the price variable, because childrearing is intensive in female time and the wife's time has an opportunity cost in the market place. When income rises, the family can afford more of both C and Z services. This is called the 'income effect'. The demand for children, hence, is expected to increase with rising family income. If inputs into child services become more costly relative to inputs into other commodities, there may be a marginal shift in demand from children to other commodities. This is called the 'price' or 'substitution' effect. Thus, there should be a negative relationship between the costs of time and goods needed to raise children and the quantity and quality of child services demanded. The value of the wife's time is determined by the amount she could earn if she were to engage in income-earning activities. The opportunity costs of women's time have most often been estimated by human capital specification that is by education and experience(4). The family demand equation for children arising out of the model is (5):

$$N = f(W_m, W_w; P_j, V) \tag{7}$$

DATA AND VARIABLES

To test the implications of the model, a recent household-level data set from rural Tamil Nadu was used with the Ordinary Least Squares method. The survey, conducted for the author's doctoral thesis, covered 670 rural households from 16 villages in the districts of Coimbatore, Periyar, Salem and Dharmapuri, between May and October 1985. The households were selected by multistage sampling. The information

collected related to motivations for having children, household size, fertility history and demographic variables, besides general socioeconomic information.

Table 1 gives the mean and standard deviation of the variables used in the empirical analysis according to landholding status of the households. The partition of rural households into cultivators and non-cultivators enables the identification of differences in family behaviour towards fertility decisions. The descriptive statistics indicate that fertility enhancing factors are stronger for landless families than for landholding families; and fertility and infant mortality are higher among landless families; on the other hand, fertility depressing factors such as male and female education are higher for landholding families.

Since fertility is a decision issue in the economic analysis of family fertility behaviour, the literature suggests that measures of actual family size may be used as the dependent variable. Ideally, one should use desired family size as the dependent variable. However, desired family size obtained from interview surveys is not suitable for vigorous quantitative analysis, because such 'imagined' measures may not resemble the typical family size of the respondent's socioeconomic stratum and may ignore fecundity impairment and contraceptive failure. Moreover, preferences are revised according to the couple's experiences. Desired family size may not correspond to the actual or realised fertility outcomes. For example, in our survey whereas the desired family size of couples is just two children, the realised number of children is more than three. Hence, completed family size and the probability of adding another child to the family at a given parity, could be better indices of actual fertility.

Completed fertility represents the culmination of a series of births, each of which may be affected by a different set of socioeconomic conditions. Thus, in this study, the dependent variable is the number of children ever born per couple (CEB). It is assumed that the couple plans a family size and executes the plan successfully to realise the desired size, given the market opportunities and resource constraints. The model allows for the specification of some predicted relationships between the exogenous variables and the dependent variables. Many studies on female labour force participation and fertility show that economically active women have less children. Also, when wage rate increases, women supply more working hours, hence, one can expect, by and large, a negative effect of female wage rate (IWAGEF) on the demand for children. Likewise, male wage rates (IWAGEM) can also display negative effects.

Educational attainments of females (EDNF) and males (EDNM) are assumed to capture the levels of household production efficiency, particularly contraceptive knowledge, and thus, they should display negative signs in family

TABLE 1

Descriptive statistics and definition of variables

Variable	Definition	All families		Landholding families		Landless families	
		Mean	SD	Mean	SD	Mean	SD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEB	Number of children ever born per couple	3.17	1.90	3.09	1.76	3.34	2.14
EDNM	Schooling of male (years)	4.26	4.60	5.13	4.71	2.54	3.85
EDNF	Schooling of female (years)	2.21	3.64	2.72	3.82	1.21	3.04
AGEM	Age of male (years)	39.77	13.06	40.67	13.60	38.00	12.90
AGEF	Age of female(years)	34.34	11.47	35.62	11.19	31.85	11.61
AGMF	Age at marriage of female (years)	17.59	2.85	17.69	2.59	17.38	3.14
INCOM ($x10^{-3}$)	Family income (Rs.)	15.93	20.22	21.03	22.91	5.92	5.47
NLNCOM ($x10^{-3}$)	Non-labour income(Rs.)	1.30	2.86	1.68	2.98	0.57	2.46
LWAGEM	Wage rate of male (Rs./day)	5.66	9.99	2.59	0.40	2.39	0.32
LWAGEF	Wage rate of female (Rs./day)	1.75	3.78	1.78	0.33	1.66	0.27
INM	Number of infant deaths	0.32	0.20	0.25	0.70	0.48	0.91
LAND	Land owned by the family (acres)	5.97	10.72	8.73	12.16	–	–
REGION	Regional dummy=1, if the family is in Coimbatore/Periyar dts., O otherwise	0.47	0.50	0.45	0.50	0.51	0.50
HHSN	Household dummy=1 if the family is nuclear; O otherwise	0.57	0.49	0.51	0.50	0.69	0.46
CASTV	Caste dummy=1, if higher caste, O otherwise	0.38	0.48	0.50	0.50	0.12	0.33
CASTT	Caste dummy=1, if lower caste, O otherwise	0.21	0.41	0.37	0.69	0.44	0.49
SIBSF	Number of siblings of female	3.24	2.04	3.18	0.25	3.33	2.01

Note : The wage rates of male and female are computed as follows:
$\log W_i = a + bH_i + cD_i + u_i$ = male, female, where $\log W_i$ is the logarithm of daily wage rate of the ith member; H_i is the human capital variables, such as age, education, health; D_i is a vector of variables influencing the demand for labour; such as local labour market conditions; a, b, c are the parameters to be estimated; and u_i is the error term.

size equations. Schooling of females also changes norms and tastes for children versus other commodities. Female education, further, enhances the ability of women in the family decision-making process. We have used the education variable primarily as a proxy for productive efficiency. However, education can have various effects on family size, and its modernising effects are every important. It affects sociocultural aspects with regard to age at marriage, value of children, contraceptive use and so on. Education changes the value of time, opportunity structure and preferences, and these changes, in turn, affect the above mentioned modernising factors. Thus, the effect of education on age at marriage, value of children and contraception are included in this analysis indirectly. Education alters the opportunity structure of the family and this affects the utility from children.

The relationship between income and fertility is a much-debated issue. A change in income may have a variety of effects on parents' demands on children, depending on the sources and the nature of income change. However, in its simplest form, if children are normal goods, as income rises, so does fertility. If the current income measure is not well defined, a measure of permanent income, such as landholding, is often used as a proxy for family income. An unanticipated but permanent increase in non-labour income would increase the demand for children. Thus, current income (INCOM), non-labour income (NLINCOM), and the area of landholding (LAND), all measures of wealth, are expected to exert a positive effect on the family size decision.

The effect of infant mortality (INM) on family size should be positive due to the greater uncertainty of child survival in rural areas. Infant mortality increases the derived demand for births by increasing the number of births required to obtain a survivor, and thus, a greater quantitative effect on the number of children demanded can be expected. Age of female (AGEF) and male (AGEM) are introduced as linear controls for differences in both the experiences of birth cohorts and the variations in their life cycle. Their effects on fertility are likely to be positive. The variable of age at marriage of the female (AGMF) is expected to display a negative effect because as the duration of married life decreases or as the age at marriage increases, the probability of conception and the childbearing period decrease, resulting in fewer births.

Nuclear families (HHSN) will demand less children, and hence, its effect is negative. Higher caste (CASTV) households will have better access to education and contraception than lower caste (CASTT) households. Thus, the effect on fertility of CASTV will be expected to be negative, and that of CASTT will be positive. Lower caste households may also demand more children for income-earning activities. Females from larger families will experience problems of raising more children, and hence the number of siblings of the female (SIBSF) will be expected to display negative coefficients.

If the household is situated in an economically developed region (REGION), it will have access to better services; its effect can be expected to be negative. Thus, in general, variables measuring the price of children are expected to exert a positive influence on the couple's demand for children.

RESULTS AND DISCUSSION

The OLS estimates of the fertility equation for household behaviour under the consumption utility framework are presented in Table 2.

TABLE 2

Regression on children ever born among rural families

Independent variable	All families		Landholding families		Landless families	
	1	2	3	4	5	6
LWAGEM	−1.002	−1.083	−1.010	1.184	−0.023	−0.131
	(1.29)	(1.56)	(1.25)	(1.38)	(0.4)	(0.10)
LWAGEF	−1.017	−1.028	−1.008	−1.457	−0.015	0.027
	(1.36)	(1.34)	(1.50)	(1.52)	(0.30)	(0.02)
INCOM ($\times 10^{-3}$)	0.003	—	0.004	—	0.020	—
	(0.70)		(0.92)		(1.06)	
LAND	—	0.009	—	0.010	—	—
		(1.58)		(1.70)		
NLINCOM ($\times 10^{-3}$)	0.003	0.002	0.004	0.033	0.034	0.024
	(1.14)	(1.02)	(1.33)	(1.38)	(0.75)	(0.62)
EDNM	−0.035	−0.052	−0.004	−0.052	−0.028	−0.010
	(2.24)	(1.90)	(2.43)	(1.76)	(0.94)	(0.49)
EDNF	−0.009	−0.093	−0.006	−0.115	−0.009	−0.009
	(0.46)	(1.51)	(0.26)	(1.50)	(0.25)	(0.10)
INM	0.883	0.883	0.804	0.807	0.928	0.917
	(12.44)	(12.54)	(8.56)	(8.71)	(8.73)	(8.57)
AGEM	0.027	0.030	0.020	0.022	0.042	0.005
	(2.96)	(6.08)	(3.65)	(3.80)	(5.22)	(5.36)
AGEF	0.048	0.055	0.033	0.043	0.069	0.069
	(4.23)	(4.58)	(2.35)	(2.83)	(4.05)	(3.99)
HHSN	−0.026	−0.042	−0.009	−0.064	−0.105	−0.144
	(0.23)	(0.37)	(0.74)	(0.50)	(0.50)	(0.68)
CASTV	−1.323	−0.903	−1.246	−1.044	−0.330	−0278
	(7.71)	(6.46)	(8.05)	(6.30)	(1.08)	(0.90)
CASTT	0.323	0.354	0.409	0.352	0.537	0.523
	(2.14)	(2.35)	(1.72)	(1.50)	(2.61)	(1.98)
SIBSF	−0.031	−0.019	−0.244	−0.013	−0.032	−0.031
	(1.14)	(0.71)	(0.74)	(0.36)	(0.68)	(0.65)
REGION	0.146	0.450	0.238	0.597	0.004	0.007
	(1.38)	(3.09)	(1.70)	(1.36)	(0.03)	(0.01)
Constant	1.85	5.46	2.42	6.81	0.96	1.18
R^2	.47	.48	.42	.44	.61	.61
N	670		444		226	

Note: Absolute 't' values in brackets

The significance level is set at 5 per cent level

The table shows separate estimates for landholding and landless families. In columns (1), (3) and (5), current income (INCOM) is included as a measure of family income. In columns (2) and (4), current income is omitted and a measure of permanent income, the size of landholding (LAND) is included, because of the ambiguity in the current income measure. In both specifications, non-labour income (NLINCOM) is included. It can be seen that there are certain variations among cultivators and non-cultivators in deciding family size. Most of the variables influence the demand for children as predicted and in the same manner in all the equations.

The effect of income is positive in all specifications, but is not statistically significant. This result is in accordance with the expectation viz., positive income effect, suggesting that children are not inferior goods in rural households. Both current income (INCOM) and landholding (LAND) coefficients are smaller in magnitude. The coefficients of non-labour income (NLINCOM) is also weak. In rural agricultural settings, the neglect of income in kind may depress measured income compared to real income.

The coefficients of male education (EDNM) and female education (EDNF) are negative in all specifications, as expected. If schooling of the male and female are proxies for productive efficiency, additional schooling increases household efficiency in production and consumption, and thereby reduces fertility. Male education is significant in columns (1) and (3), however, female education is not significant in any of the specifications. The low educational level of rural women (mean 2.21 years) may not strongly influence household decisions[1].

The positive relationship between infant mortality (INM) and fertility is consistent with the replacement hypothesis; with greater uncertainty about the survival of children in rural households, parents tend to increase the number of births, and this behaviour is very strong as the parents' goal is to have a greater number of surviving children. The coefficients of age of male (AGEM) and age of female (AGEF) are positive and statistically significant in all equations. The coefficient of female age at marriage (AGMF) is also significantly negative in all specifications, confirming the prediction that woman married at a young age will have more children and that long exposure to family life results in more children.

As expected, the coefficients of male wage rate (LWAGEM) and female wage rate (LWAGEF) are negative in all specifications, except female wage rate in the second specification of landless families. However, none of them are statistically significant. This shows that, even though there is some price effect, it may not be strong enough to influence household decisions with regard to fertility. Especially in rural families, child care is compatible with agricultural works, and this might simultaneously have weakened the price effect.

Test variables, such as nuclear household (HHSN) and siblings of female (SIBSF) are negative in all specifications. Higher caste dummy (CASTV) is also negative and statistically significant in the case of all families and landholding families. Lower caste dummy (CASTT) is positive and significant in all families and landholding families. These results indicate that lower caste families in rural areas need more hands to support the family and higher caste families prefer more quality from fewer children. The region dummy is positive, contrary to expectations, but statistically insignificant. The presence of many small-scale industries in these districts may encourage child labour and hence there is an incentive to have more children.

The exogenous variables included in the empirical analysis explain about 42 to 61 per cent of the variations in children even born in rural families, a reasonably good fit.

SUMMARY AND CONCLUSION

In this paper, we have tried to analyse the family building behaviour of rural couples, treating children as a source of consumption utility to parents. A household production model has been used and the implications have been empirically tested, using the OLS method and a recent household level data set from rural Tamil Nadu. The results, in general, support the expectations of the model, but are not strong enough to influence parental behaviour. The empirical results show that the coefficients of wage rates are consistently negative, however, significant in any of the specifications. On the other hand, male education has some effect on fertility behaviour. The effect of income is also weak. It seems that parents' valuation of children as a source of satisfaction (consumption utility) has limited value. In fact, children's pecuniary (monetary) contributions seem to influence parental decisions to a considerable extent in rural families.

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NOTES

1. The idea that own children is a source of satisfaction to parents is not new; the Tamil classic 'Thirukkural' refers to the high quality of pleasure desired from children and 'Naladiyar' refers to the economic value of children.

2. This paper is not concerned with either life cycle profiles or inter-generational aspects. Children are assumed to provide only consumption utility and not any other form of utility. Supply side factors are also not given explicit consideration.
3. Leisure-time is included in home production.
4. Equation (7) does not include the complete set of demand functions; only the demand for children is estimated.
5. In order to find the possible non-linear effect of education, we estimated a separated equation. The estimates are:

$$\begin{aligned} LCEB = 2.44 &+ \underset{(0.58)}{0.136}\ AGEF + \underset{(3.33)}{0.130}\ AGEFSQ - \underset{(0.59)}{0.115}\ EDNF \\ &- 0.281\ EDNF2 - 0.119\ EDNFSQ \qquad R2 = 0.20 \end{aligned}$$

where EDNF1 = female; primary educated
EDNF2 = female; secondary educated
AGEF = age of female
and AGEFSQ and EDNFSQ are the squares of AGEF and EDNF respectively

In this case also the co-efficients of female education are negative, and none of them are significant.

REFERENCES

1. Becker, G.S.: "An economic analysis of fertility", in *Demographic and Economic Change in Developed Countries*, Universities - National Bureau Conference Series No. 11, Princeton University Press, Princeton, USA (1960).
2. Becker, G.S.: "A theory of allocation of time", *The Economic Journal*, 75: 229 (1965).
3. Willis, R.J.: "A new approach to the economic theory of fertility", *Journal of Political Economy*, 81 (2): 2 (1973).

ANALYSIS OF ADOPTION PREFERENCES OF FAMILY PLANNING ACCEPTORS THROUGH DISCRIMINANT FUNCTION

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INTRODUCTION

The area of Paharganj in New Delhi has been allotted to the Lady Hardinge Medical College (LHMC) by the Delhi Administration for promoting family planning acceptance by providing both educational and motivational programmes as well as services. The area has about 10,000 households. In collaboration with the (LHMC) and Smt. Sucheta Kripalani Hospital, the Institute for Research in Medical Statistics collected data on the adoption of family planning practices in this area during 1987-88.

This paper attempts to examine the acceptance of family planning and the minimum level of female literacy necessary for such acceptance by couples having various combinations of male and female children by using the parameters of the discriminant analysis function[1,2].

DATA

The survey conducted in 1987-88 covered around 4000 households of Paharganj in Delhi. These contained a total of 2349 eligible couples (with the wife in the reproductive ages of 15 to 44), of whom 1535 were family planning users and 814 were non-acceptors. The area had an effective couple protection rate of about 60 per cent and the main determinants of family planning acceptance were female literacy and number of male children.

RESULTS AND DISCUSSION

As many as 65 per cent of the 2349 eligible couples under study had accepted a method of family planning. A method-wise break-up of the acceptors among the total couples under study indicated that 25.8 per cent had opted for sterilisation, 28.3 per cent for Nirodh, 8.6 per cent for the IUD, 0.9 per cent for the oral pill, and 1.7 per cent for other methods like foam

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tablets or jelly/cream. The effective couple protection rate in the study area worked out to about 60 per cent. The analysis in the following paragraphs has been confined to acceptors of sterilisation, IUD and the condom; acceptors of the other methods who constituted a negligible 2.5 per cent have not been considered.

Table 1 presents selected characteristics such as the average age of the wife, average number of male children and literacy level among acceptors and non-acceptors of family planning. It is interesting to note that except for the wife's literacy level, the other characteristics of the non-acceptors were almost similar to those of spacers.

TABLE 1

Some important characteristics of sterilisation, condom and IUD acceptors and non-acceptors

	Sterilisation	IUD	Condom	Non-acceptors
Average age of wife (years)	35.23*	30.32	29.46	31.17
Average number of living children	3.90**	2.59	2.48	2.40
Average number of male children	2.35**	1.52	1.51	1.80
Percentage of wives who are				
Literate	59.19	88.86**	78.06**	53.32
Completed high school and above	22.15	55.22**	47.20**	25.55

* Significant at 5% with respect to non-acceptors.
** Significant at 1% with respect to non-acceptors.

An age-wise distribution of the acceptors of sterilisation, IUD and condom, and of non-acceptors, presented in Table 2, indicates that about 18 per cent of the couples who had accepted one of the three methods was under 19, 54 per cent were between 20-24 years; over 65 per cent were between 25-29 years; and over 75 per cent were in the age group 30-39 years. Among those aged 40 years and above, 54 per cent were planning their families.

Almost all the acceptors who were under 19 were using the condom while an overwhelming 93 per cent of those aged 20-24 years were acceptors of either the condom or IUD. Further, in the 25-29, 30-34 and 34-39 age groups, the percentage of sterilisation acceptors showed a sharp increase with age, the proportion of IUD acceptors remained at almost the same level, whereas the proportion using condoms declined with age.

An analysis by educational level of the wife (Table 3) indicated that a little over half (53 per cent) of the illiterate couples had accepted family planning; of these almost two-fifths were sterilisation acceptors.

TABLE 2

Distribution of sterilisation, condom and IUD acceptors and non-acceptors by age of wife

Age Group	Condom	IUD	Sterilisation	Non-acceptors	Total
15-19	5(14.7)	–	1(2.9)	28(82.4)	34(100.0)
20-24	159(41.2)	33(8.7)	15(3.6)	179(46.5)	386(100.0)
25-29	198(36.2)	66(12.1)	91(16.6)	192(35.1)	547(100.0)
30-34	161(32.7)	57(11.6)	155(31.5)	119(24.2)	492(100.0)
35-39	91(23.6)	28(7.3)	73(44.9)	93(24.2)	385(100.0)
40-44	51(11.5)	18(4.1)	171(38.6)	203(45.8)	443(100.0)
Total	665	202	606	814	2287(100.0)

Figures in brackets indicate row-wise percentages

TABLE 3

Distribution of sterilisation, condom and IUD acceptors and non-users by education of wife

Education	Condom	IUD	Sterilisation	Non-acceptors	Total
Illiterate	145(18.2)	24(3.1)	247(31.1)	380(47.7)	796(100.0)
Literate	24(23.5)	8(7.8)	32(31.3)	38(37.5)	102(100.0)
Primary	83(27.2)	23(7.5)	105(34.4)	94(30.8)	305(100.0)
Middle	97(31.0)	35(11.2)	87(27.8)	94(30.0)	313(100.0)
High school	203(39.9)	66(13.0)	106(20.8)	134(26.3)	509(100.0)
Graduate	109(42.6)	45(17.5)	28(10.9)	74(28.9)	256(100.0)
Total	661	201	605	814	2281(100.0)

The educational level of six respondents was not specified.

Among literate couples a little less than two-thirds were acceptors of family planning. Family planning acceptance increased to about 70 per cent among couples with a primary or middle level education, and to about 75 per cent among those who had a high school or higher education.

The number of male children which has been observed to influence the adoption of contraception, was also studied among acceptors and non-acceptors. The results are presented in Table 4. Interestingly, about 60 per cent of couples who had no male child were practising family planning, mainly the condom or IUD, while among those with one male child, an almost equal proportion (58 per cent) were contracepting - of these, about 58 per cent were using the condom, and 19 and 23 per cent respectively were using the IUD or had been sterilised.

TABLE 4

Distribution of sterilisation, condom and IUD acceptors and non-acceptors by number of male children

No. of male children	Condom	IUD	Sterilisation	Non-acceptors	Total
0	115(45.6)	24(9.5)	11(4.4)	102(40.5)	252(100.0)
1	256(33.6)	83(10.9)	104(13.6)	319(41.9)	762(100.0)
2	97(27.4)	72(10.1)	267(37.2)	182(25.3)	718(100.0)
3	52(18.6)	15(5.4)	147(52.7)	65(23.3)	279(100.0)
4+	45(16.3)	8(2.9)	77(27.9)	146(52.9)	276(100.0)
Total	665	202	606	814	2287(100.0)

Figures in brackets denote row-wise percentages.

The percentage of sterilisation acceptors among all acceptors with two, three and four or more male children increased sharply from 23 per cent to over 60 per cent, with a concomitant decrease in those who used spacing methods. Nevertheless, as the results show, as many as 30 to 40 per cent of acceptor couples who had two or more male children had not adopted a permanent method of family planning and continued to use a spacing method. Further, over half of those who had four or more male children were not using any form of contraception. These findings call for greater efforts to promote acceptance among these groups.

In discriminant analysis, the problem of identification is one of deciding the membership of an individual to a given set of groups (say K) to which he can possibly belong. Discriminant functions (linear function of variables) are worked out for each of the K groups, and given an individual with measurements of different variables, his discriminant scores for various groups are computed. The individual is assigned to the group for which his discriminant score is highest. The three groups considered were sterilisation acceptors, IUD users and non-acceptors of family planning. The variables considered were education of wife, number of male children and number of female children as the main determinants in deciding the adoption behaviour of family planning methods.

The main assumption underlying discriminant analysis is the homogeneity of variances. For testing this assumption, the variances of the characteristics were worked out for the three groups of couples namely non-acceptors, IUD users and sterilisation acceptors. Bartlett's test was applied for testing the homogeneity of variances.

Table 5 presents the values of variances for the three groups of couples.

TABLE 5

Variances of different variables

Group	Education of wife	Number of male children	Number of female children
Non-acceptors	3.4629	1.3994	1.6386
IUD acceptors	2.6145	0.8067	1.1335
Strerilisation acceptors	2.8771	1.1549	1.5431

The calculated values of X^2 for education of wife, number of male and female children worked out to 2.21, 5.62 and 2.48 respectively. These values are less than the table value of X^2 for 2 d.f. [X^2 (.05) = 5.99; X^2 (.001) = 9.22]. Thus, the differences in variances for each variable among the three groups were not significant.

The discriminant functions obtained were as follows:

$Y_1 = -6.02104 + 1.88084\ X_1 + 1.84675\ X_2 + 1.23613\ X_3$...IUD users

$Y_2 = -6.20038 + 1.54177\ X_1 + 2.41705\ X_2 + 1.43937\ X_3$... sterilisation acceptors

$Y_3 = -3.28792 + 1.38483\ X_1 + 1.31486\ X_2 + 0.98333\ X_3$...non-acceptors of family planning, where

X_1 = Education of wife

X_2 = Number of male children

X_3 = Number of female children

$D_2 = 900.87$ **

F value = 159881.95**

Thus, the discriminant function was observed to have a very high discrimination power. The probability of right classification was around 0.85. It would appear from these functions that the coefficient of female literacy is highest for IUD users followed by sterilisation acceptors and non-acceptors. But the coefficient for the number of male children as well as female children is highest for sterilisation acceptors followed by IUD users and non-acceptors.

On the basis of these discriminant functions, individuals with varying numbers of children and literacy levels were classified as non-acceptors, IUD acceptors and sterilisation acceptors on the basis of the highest value of discriminant scores. The results are presented in Table 6.

TABLE 6

Classification status according to female literacy and number of children

Sex preference		Female literacy level					
Male	Female	Illiterate	Literate	Primary	Middle	High	Graduate and above
0	0	NU	NU	NU	NU	NU	NU
0	1	NU	NU	NU	NU	NU	IUD
0	2	NU	NU	NU	NU	NU	IUD
1	0	NU	NU	NU	NU	IUD	IUD
1	1	NU	NU	NU	IUD	IUD	IUD
2	0	NU	NU	NU	IUD	IUD	IUD
0	3	NU	NU	NU	IUD	IUD	IUD
1	2	NU	NU	NU	IUD	IUD	IUD
2	1	NU	STRL	STRL	IUD	IUD	IUD
3	0	STRL	STRL	STRL	STRL	IUD	IUD

NU = Non-user, STRL = Sterilisation acceptor, IUD = IUD user

Table 6 indicates that couples with one or two male children may accept the IUD if the wife has at least a middle or higher secondary education, but if the wife is a graduate and has no male child, she would be likely to use the IUD. Thus, if family planning acceptance has to be increased, it is essential to increase the educational status of women to the desired level.

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REFERENCES

1. Snedecor, G.W. and Cochran, W,G,: *Statistical Methods*, Oxford IBM Publication, London (1967).
2. Rao, C.R.: *Linear Statistical Inference and its Applications*, Wiley Eastern Pvt. Ltd., New Delhi (1973).

IMPACT OF CHILD MORTALITY ON FAMILY SIZE DESIRES AND FAMILY PLANNING PRACTICE AMONG WHITE-COLLAR WORKERS

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INTRODUCTION

High family size desire and low acceptance of family planning constitute the two main factors underlying the high fertility of the Indian population. Excessive loss of children in early childhood in rural areas is considered to be contributory to both of the above factors. The primary purpose of this paper is to investigate the impact of child mortality on completed family size desire and current use of family planning methods among white-collar workers of Lucknow city, who constitute the educated and relatively enlightened section of the urban population.

HYPOTHESES AND DATA

The study has been conducted within the framework of the child survival hypothesis, which states that "experience with or fear of child mortality may lead parents to have additional births either to 'replace' those who have actually died or as an 'insurance' against expected deaths"[1,2]. In view of this, three hypotheses have been tested. The first states that for 'replacing' dead children, a smaller proportion of couples with child mortality experience cease to want additional children at each birth order than corresponding proportions who have not experienced any child loss. The second hypothesis is that to 'insure' against possible deaths, couples with child loss experiences would desire a larger number of surviving children in their completed families as compared to those with no such experience. And finally, that on account of 'child replacement' and 'child insurance' motivations, smaller proportions of couples with an experience of child loss in the early stage of childbearing would tend to practice family planning throughout their reproductive life than corresponding proportions who have not had such an experience.

The analysis is based on the data collected from a fifty per cent sample of currently married white-collar workers working in the Uttar Pradesh Government Secretariat in Lucknow city, the capital town of the state during 1982-83, in connection with a survey of fertility and family planning among white-collar workers[3]. For a more realistic assessment, only the data

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collected from 1085 workers who had at least one living child was utilised for the analysis.

Since completed family size desire including lack of desire for additional children at a particular stage of the reproductive cycle is also influenced by socio-economic factors, the influence of these factors has been controlled in order to isolate the impact of child loss. Among them, religion and caste status of the workers, education of wife and per capita family income were found to exert important influences on family size desires and family planning acceptance[3], and hence have been controlled by classifying workers into these groups for the analysis. In addition, the current age of the wife which influences the use of family planning methods, has been controlled for studying the impact of child loss during the first two live births. However, in order to get a sufficient number of observations in each cell, as far as possible, closer socio-economic categories and current ages of wife have been combined. As the hypothesis states that a larger proportion of couples without child loss experience would not desire additional children compared to their counterparts with such experience, the difference in proportions has been tested using a one-sided test. Likewise, the difference in proportions using family planning and the difference in the mean number of children desired in a completed family, have also been tested in the same way.

RESULTS AND DISCUSSION

Lack of desire for additional children

The impact of child mortality on lack of desire for additional children was analysed by parity for testing the 'child replacement' hypothesis. Table 1 presents the results of this analysis.

TABLE 1

Distribution of couples desiring no more children by child loss experience

Parity	% couples with no child mortality experience	% couples with child mortality experience	Significance of difference in proportions	
			Z value	Level of significance
1 and 2	53.4 (388)	30.0 (40)	2.82	$P < .01$
3	90.5 (210)	56.3 (32)	5.19	$P < .001$
4	96.7 (122)	87.5 (48)	2.29	$P < .05$
5 or more	99.1 (112)	94.7 (132)	1.92	$P < .05$

Figures in brackets denote number of couples.

Table 1 reveals that at each parity, the proportion of couples desiring 'no more' children is significantly higher among couples with no experience of child loss as compared to those who had such experience, thereby supporting the 'child replacement' hypothesis.

An analysis of the impact of child loss on non-desire for additional children was conducted for different socio-economic groups to ensure that the differences between the two groups of couples (with and without child loss experience) at different parities, are controlled for the effect of socio-economic status. This has been presented in Table 2.

TABLE 2

Distribution of couples desiring no more children by parity, child loss experience and socio-economic status

A. *Religion*

Parity	Hindus		Muslims	
	No child loss experience	With child loss experience	No child loss experience	With child loss experience
1 & 2	53.2 (353)	33.4 (36)	48.3 (29)	0.0 (4)
3	91.1 (192)	64.0 (25)	81.3 (16)	33.3 (6)
4	96.4 (112)	88.9 (45)	100.0 (8)	50.0 (2)
5 or more	98.9 (92)	94.9 (118)	100.0 (20)	92.9 (14)

B. *Caste status*

Parity	High caste Hindu		Middle and low caste Hindu	
	No child loss experience	With child loss experience	No child loss experience	With child loss experience
1 and 2	59.4 (271)	50.0 (24)	33.0 (82)	0.0 (12)
3	93.2 (146)	75.0 (16)	84.8 (46)	44.4 (9)
4	96.6 (89)	96.6 (29)	95.6 (23)	75.0 (16)
5 or more	100.0 (76)	96.8 (95)	93.8 (16)	91.3 (23)

C. *Education of wife*

Parity	Below high school		High school and above	
	No child loss experience	With child loss experience	No child loss experience	With child loss experience
1 and 2	49.1 (106)	21.7 (23)	54.9 (282)	38.9 (18)
3	88.5 (96)	55.6 (18)	92.1 (114)	57.2 (14)
4	93.6 (63)	86.2 (29)	100.0 (59)	89.5 (19)
5 or more	98.5 (68)	93.9 (99)	100.0 (43)	96.9 (32)

TABLE 2 *(Contd.)*

D. *Per capita monthly family income*

Parity	Rs. 300 and below		Rs. 301 and above	
	No child loss experience	With child loss experience	No child loss experience	With child loss experience
1 and 2	47.8 (238)	0.0 (18)	63.4 (153)	54.5 (22)
3	87.3 (150)	50.0 (24)	98.3 (60)	75.0 (8)
4	96.8 (92)	81.2 (32)	96.7 (30)	100.0 (16)
5 or more	98.8 (81)	93.9 (99)	100.0 (31)	97.0 (33)

Figures in brackets denote number of couples.

The results show that in each socio-economic group and at each parity, a larger proportion of couples with no experience of child loss do not want additional children compared to those with such experience, except in a few cells where the number of observations is too small. These findings reveal a positive impact of child loss on desire for additional children in each socio-economic group as a result of the 'child replacement' motivation.

Completed family size desire

The second aspect of the desire for additional children is desired completed family size, which is derived by adding the desire for additional children to the number of surviving children. It was hypothesised that for 'insuring' the survival of an adequate number of children to outlive them, couples with experience of child-loss would desire a larger number of surviving children as compared to those with no such experience. Table 3 presents the analysis of the impact of child loss on desired completed family size desire.

TABLE 3

Distribution of respondents by mean desired completed family size by child loss experience

Child loss experience	Number of couples	Desired completed family size		Significance of difference in means	
		Mean	SD	T value	Level
0	834	3.17	1.42		
1 or more	252	3.73	1.54	5.36	P ⟨ .001

As Table 3 shows, couples who have suffered child loss want a significantly larger number of surviving children in their completed families than do those the who have not known any child loss, in order to 'insure' the survival of an adequate number of children till their old age (for they are apprehensive of future child loss). The findings then provide evidence for the 'child insurance' hypothesis.

When controlled for socio-economic status of the couples, the mean number of children desired in completed families was consistently larger for couples with child loss experience in each socio-economic group, with the only exception of the highest per capita income group of Rs. 401 and more (Table 4).

TABLE 4

Distribution of couples by mean desired completed family size and by child loss experience and sotio-economic status

Characteristics	Couples with no child loss experience		Couples with child loss experience	
	No. of cases	Mean desired family size	No. of cases	Mean desired family size
Religion				
Hindus	747	3.13	224	3.71
Muslims	70	4.12	22	4.68
Caste status				
High caste Hindu	580	3.15	164	3.65
Middle caste Hindu	90	3.00	29	3.69
Lower caste Hindu	77	3.16	31	4.06
Education of wife				
Below primary	142	3.50	81	4.08
Primary & middle	192	3.77	86	3.85
High school and intermediate	276	3.09	59	3.60
Graduate and above	220	2.55	24	2.72
Per capita family income				
Rs. 200 and below	258	3.51	89	4.13
Rs. 201-300	295	3.19	86	3.98
Rs. 301-400	138	2.96	36	3.56
Rs. 401+	137	2.80	40	2.78

The results thus provide evidence that 'child insurance' motivation is operative in almost all the socio-economic groups among white-collar workers.

Current practice of family planning

Due to the operation of 'child replacement' and 'child insurance' motivations, couples who have experienced child loss in the early stages of childbearing are hypothesised to practice family planning in smaller proportions than are those who have had no such experience. Since the use of family planning varies by the age of the wife, the impact of child loss at the first two live births has been analysed in two age groups, namely the prime reproductive age group of below 30 years and the advanced age group of 30 years and above.

The findings as presented in Table 5 reveal that in all cases, couples with early experience of child loss practice family planning in significantly smaller proportions than do those without such experience. This difference, even in the 30+ age group, suggests that couples who have suffered the loss of children in their early childbearing years, remain apprehensive of child loss in the future, which prevents them from readily accepting family planning even after their desired number of children have been born.

TABLE 5

Impact of child loss experience of couples on family planning practice

Age of wife (years)/ child loss experience first two live births	Number of cases	Percent current users	Difference in proportions	
			Z value	Level of significance
Below 30				
Without child loss experience	316	71.8		
With child loss experience	49	53.1	2.64	P $<$ .01
30 and above				
Without child loss experience	585	76.6		
With child loss experience	131	57.3	4.50	P $<$ .001
All ages				
Without child loss experience	901	73.5		
With child loss experience	184	56.0	4.74	P $<$ .001

Table 6 gives these findings after controlling for the socio-economic status of the couples, again distributed into two age groups of under and over 30 years.

TABLE 6

Percentage of couples practicing family planning by child loss experience in first two live births by socio-economic status

Characteristics	Couples with no child loss experience		Couples with child loss experience	
	Number	% FP users	Number	% FP users
Religion				
Hindus				
Below 30 years	288	71.5	41	53.6
30 or more years	518	73.8	124	57.2
Muslims				
Below 30 years	28	75.0	7	71.4
30 or more years	54	59.3	10	60.0
Caste status				
Hindu high				
Below 30 years	175	73.7	17	58.8
30 or more years	447	74.3	105	56.2
Hindu middle				
Below 30 years	63	69.9	11	45.5
30 or more years	38	76.3	7	57.2
Hindu low				
Below 30 years	50	66.0	13	46.1
30 or more years	33	93.9	12	66.7
Education of wife				
Below high school				
Below 30 years	128	66.4	34	52.9
30 or more years	229	75.4	92	58.7
High school or more				
Below 30 years	188	75.5	15	53.3
30 or more years	335	74.6	42	52.4
Per capita family income				
Rs.300 and below				
Below 30 years	258	70.5	42	54.8
30 or more years	346	82.6	84	63.1
Rs.301 and above				
Below 30 years	55	80.0	9	33.3
30 or more years	239	62.4	51	47.1

It is clear that at all socio-economic levels except one, in which the number of observations are too small, a markedly lower proportion of couples with child loss experience practice family planning than do those without any such experience. The differential is generally larger in the 30+ age group,

suggesting that early experience of child loss makes couples so uncertain about the survival of all their children that even at later ages, they avoid family planning irrespective of the socio-economic level to which they belong.

CONCLUSION

In sum, the analysis of the impact of child loss on family size motivation brings out that white-collar workers in general, as well as at each socio-economic level, faced with the experience of child loss, move to higher birth orders for 'replacing' their dead children in larger proportions than do those without such experience. Likewise, couples, total as well as at each socio-economic level, except the highest per capita income, with child loss experience, desire more children in their completed families for 'insuring' the survival of an adequate number to adulthood compared to those who have no child loss experience. And finally, early experience of child loss has a negative influence on current use of family planning irrespective of the age group of the wife as well as socio-economic level of the white-collar worker. In the early ages (below 30), this negative impact appears to be the result of both 'child replacement' and 'child insurance' motivations and at later ages (30 and above), by which time the required number of children are expected to have been produced, this negative impact appears to be solely the result of the 'child insurance' motivation.

The findings of the study reveal that even among white-collar workers, who constitute an educated and relatively enlightened class, the incidence of child mortality exercises a positive impact on family size desires and a negative influence on the use of family planning devices. The findings point to the urgency of controlling infant and child mortality to facilitate the acceptance of small families and to remove a big obstacle to the success of the family planning programme in the country. For the purpose, serious implementation of infant and child health care programmes is urgently needed.

REFERENCES

1. United Nations: *Family Building by Fate or Design*, United Nations, New York, 1987.
2. United Nations: "Inter relationship between child survival and fertility", *Population Bulletin of the United Nations*, No. 25, p. 27-50, 1988.
3. Srivastava, J.N., Saksena, D.N. and Verma, S.K.: *Fertility and Family Planning among White-collar Workers*, Population Research Centre, Department of Economics, Lucknow University, Lucknow, 1988.

CHILD HEALTH CARE: IS THERE A GENDER DIFFERENCE?

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INTRODUCTION

Discrimination against female infants and children though known to be prevalent, is not sufficiently substantiated in terms of the health care received by girl children. A few studies such as the one by Sen and Sengupta[1] in West Bengal report a high prevalence of malnutrition among female as compared to male children as a result of inadequate health and nutritional care. However, according to a survey conducted between 1973 to 1980 by the National Nutritional Bureau in ten states, there was no difference in the level of malnutrition among male and female pre-school children[2]. Gopalan[3] also did not observe any gender bias in nutritional care among rural pre-school children. The present study was conducted to determine whether any gender bias exists in reality regarding the provision of health care to children.

SAMPLE AND METHODOLOGY

The study was conducted in the Pondicherry region of the Union Territory of Pondicherry. Pondicherry has a well organised health care delivery system and the per capita expenditure on health care is among the highest in India.

The indicators used to assess gender bias in relation to health care were the utilisation of under-fives clinic (UFC) services, immunisation coverage, attendance at Anganwadis, and breastfeeding and supplementary feeding practices including the use of baby foods.

The number of male and female children attending the clinic conducted weekly at the six Primary Health Centres in the Pondicherry region as well as at an Urban and a Rural Health Centre attached to the Department of Preventive and Social Medicine, JIPMER, Pondicherry, during August 1990, was recorded. In addition, mothers of all female children in the age group 0-2 years who had not been brought to the UFC at the Rural or Urban Health Centres were interviewed at home to elicit the reasons for the non-utilisation of UFC services. Similarly, mothers of an equal number of male and female

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children who visited the UFC, were interviewed to study the reasons for taking their children to the UFC.

The breastfeeding and supplementary nutrition pattern of children was studied by preparing a list of children aged six months to two years in the service area of the Urban and Rural Health Centre. Hundred male and 100 female children were selected by the simple random method after matching for socio-economic status on the basis of monthly per capita income. The mothers of the selected children were interviewed to elicit information regarding breastfeeding and supplementary feeding practices and the use of baby foods.

The enrolment and attendance at 130 Anganwadis under an Integrated Child Development Services (ICDS) project obtained from the records at these centres were analysed sex-wise for studying gender differences in the utilisation pattern, if any. An immunisation evaluation survey using the 30 cluster sampling method conducted in Pondicherry in February 1990, provided information regarding immunisation coverage.

RESULTS

The attendance of male and female children at the under-fives clinics conducted in the month of August 1990 in the six Primary Health Centres, and the Rural and Urban Health Centres is presented in Table 1.

TABLE 1

Sex-wise distribution of beneficiaries at the under-fives clinics in various health centre

Health Centre	Number of children aged 0-2		UFC attendance per clinic		Total
	Male	Female	Male	Female	
Mettupalayam	295	360	18	20	38
Villianur	664	744	40	43	83
Thavalakuppam	340	290	25	15	40
Kirumampakkam	373	481	27	22	49
Katterikuppam	256	247	13	11	24
Kalapet	270	240	14	11	25
Rural Health Centre	178	205	16	14	30
Urban Health Centre	146	145	8	8	16

As seen from Table 1, the first two health centres—Mettupalayam and Villianur—recorded a higher attendance of male than of female children. However, the difference was not statistically significant ($P > 0.05$); these two health centre areas also had a higher number of female than male children in the age-group 0-2 years. In the remaining five UFCs except that at the

Urban Health Centre, the attendance of boys was greater than that of girls, and taken together, was significantly higher ($p < 0.05$). But, when analysed separately, none of the UFCs showed any significant difference. Similarly, when all the eight centres were considered together, there was no significant gender-wise difference in the utilisation of UFC services.

Table 2 provides the reasons given by mothers of 30 female children in the age-group 0-2 years who did not avail of UFC services at the Rural and Urban Health Centres.

TABLE 2

Reasons for not bringing female children to the under-fives clinic

Reason	Number of respondents	Percent
Going for work in the field	10	33
Taking children to a private medical practitioner	9	30
Immunisation given at home by the health worker	4	13
Child not due for immunisation	3	10
Busy with domestic work	2	7
Child was all right	2	7
Total	30	100

As evident from the table, about a third of the mothers (33 per cent) mentioned that they were busy working in the field and so could not find time to visit the UFC. None of them mentioned the sex of the child as the deciding factor for not taking the child to the clinic. Interestingly, the elder male sibling in some of these families was also not taken to the UFC for the same reason, implying that male children did not receive any preferential treatment. Another one-third (30 per cent) did not bring their children—both male and female—to the UFC since they could afford to consult a private medical practitioner; the per capita income of these families was more than Rs. 200 per month.

Mothers of 30 male and 30 female children who attended the UFC were also interviewed to find out why they had brought their children to the clinic. It was observed that 77 per cent of the mothers of the male children and 74 per cent of those of female children, mentioned immunisation as the main purpose of visiting the UFCs, followed by treatment of an illness (26 per cent of mothers of male and 33 per cent of mothers of female children). Other reasons such as to record the weight of the child and to get a routine

check-up were given by 20 per cent and 17 per cent respectively of the mothers of boys and 17 per cent and 14 per cent respectively of the mothers of girls. The differences in their responses were not statistically significant.

The breastfeeding and supplementary feeding practices of 100 male and 100 female children indicated that the large majority (90 per cent) of both male and female children were breastfed from the first day of delivery itself. The mean duration of breastfeeding was 14 months, both for male and female children. Again, no difference was noted between boys and girls regarding the time of introduction of supplementary foods which was around four and a half months in both groups.

Another interesting finding was that only 28 per cent of the children in the study group were being given tinned baby foods; this was the same for both boys and girls. The average monthly expenditure on baby foods was Rs.51 for the male child and Rs. 47 for the female child; the difference was not statistically significant ($P > 0.05$)

As far as the utilisation of Anganwadi services was concerned, 96 per cent of the boys and 98 per cent of the girls aged 0-3 were observed to benefit from the scheme. Among the pre-school age group, 85 per cent of the boys and 87 per cent of the girls availed of Anganwadi services.

Regarding immunisation coverage under the Universal Immunisation Programme, BCG coverage was 97 per cent and 94 per cent among boys and girls respectively. Corresponding figures for the third doses of DPT and polio vaccines were 99 per cent and 96 per cent respectively. In the case of measles, there was a difference of 7 per cent in immunisation coverage, with boys being better protected than girls (92 percent and 85 per cent respectively), though the differnce was not statistically significant ($p > 0.05$).

DISCUSSION

The study attempts to find out whether female children are given less health care by the family or mothers, using certain indicators. The first indicator, that is the utilisation of under-fives clinics services, did not indicate any significant difference in the utilisation pattern for male and female children when attendance at each UFC was analysed separately or when all the UFCs were considered together. This suggests that in Pondicherry, the UFCs are being utilised almost equally by boys and girls. Reasons for not availing of UFC services were related to economic conditions which compel mothers to work in the fields thereby finding little time to care for their children, in a third of the cases. The provision of domiciliary services by health workers was another reason. In some of these families even male elder siblings were not taken to the UFCs, while others did not visit the UFC, but did not neglect their female children—they took them to private practitioners as they could afford the expense. Thus, there was no gender discrimination.

Breastfeeding and supplementary feeding practices for male and female children were also found to be identical. The pattern of use of baby food, under the assumption that gender discrimination would lead to less money being spent on girl children, also did not indicate any gender bias.

REFERENCES

1. Sen, A. and Sengupta, S: "Malnutrition of rural children and the sex bias" *Economic and Political Weekly* 18: (1983).
2. Sastry, G. J., Vijayaraghavan, K. and Prahlad Rao, N.: "Indian pre-school children—A profile of stunting and wasting" *Journal of Tropical Paediatrics*, 35(5): (1989).
3. Gopalan, C.: "Gender bias in health and nutrition care" *NFI Bulletin*, 8:4 (1987).

THE GANDHIAN THEORY OF POPULATION: RELEVANCE AND IMPLICATIONS

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There is an abundance of academic material on Gandhian thought. Both in India and abroad, particularly in America and England, a large number of publications on anthology, thoughts and critical appraisal have been brought out during the last five decades. Also, recent years have seen a renewal of interest in Gandhian theory, possibly due to ecological thinking, economic problems, terrorism and the 'crises' of civilisation. However, in keeping with Gandhian tradition, most of the published work has concentrated on metaphysical questions or on particular aspects of social movements and transformation. Social scientists have not paid heed to the Gandhian framework by raising issues or analysing empirical data. Social demography, that is the sociological theory of population, is no exception. Social demographers have used Malthusian, Marxian and Weberian theories of demographic change. There is also a feeling that the Western perspective has been applied to no avail. In such a situation, when social scientists in general, and demographers in particular, are looking for a non-Western alternative and a more apposite paradigm to look at Indian reality, there appears to be a need to examine the Gandhian theory of population.

In an exploratory study of the Gandhian theory of population the following questions may be raised:

(a) What is the Gandhian theory of population? How did Gandhi himself view the growth and control of population?
(b) What, in general, are the metaphysical and political implications of the Gandhian paradigm for population control? In other words, what are the covert functions of Gandhian social transformation for population control?
(c) What are the pitfalls of the Western theory of population?
(d) What charges are usually levelled against the Gandhian theory and how does it counter them?
(e) How can the Gandhian theory of population be applied today and what would its implications be?

This paper attempts to examine the above questions. Here, it may be noted that Gandhi was not a social scientist. He was a practical idealist

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who had neither the time nor the aptitude for constructing systematic philosophy[1]. Therefore, when one examines his ideas in the context of social scientific tradition one may find that they are open to several interpretations. To the author certain observations are salient in analysing Gandhian theory: (a) Gandhian theory of society is rooted in Gandhian metaphysics which is strongly influenced by the Indian mystical tradition common to different schools of Indian philosophy; (b) It needs to be constructed partly from his own writings, speeches, notes, etc. and partly from his social experiments; and (c) It has evolved with time, sometimes contradicting the earlier position in some respects, but it has never negated its metaphysical substratum.

Gandhian Theory of Population

Gandhi had expressed a deep concern for population control on several occasions. The main source of his ideas on population are his autobiography and the report of the summit meeting on birth control in 1935, in which he had held lengthy discussions with Margaret Sanger of the International Planned Parenthood Federation (IPPF). It may be noted that at that time there were not many buyers of the population theory. Margaret Sanger had just undergone a jail term for 30 days (in her own country) for holding views favourable to birth control.

Gandhi had favoured population control. Yet his argument in favour of population control was not the usual Malthusian fear of over-population. In 1925, in *Young India* he wrote that if suitable improvements could be made in the laws relating to land and the state of agriculture, and an allied occupation could be provided, India could support twice its population[2]. The population of India at that time was about 262 millions. Today, as per the 1991 Census, it stands at 843.9 million[3]. Therefore, today, there is all the more reason to control the population, particularly since the perception of the ecological crisis is more vivid than it was in Gandhi's time. His support for birth control was related to the "political" situation of the country. He said that there could be no two opinions on the necessity for limiting births[2]. But, like Marx, he rejected the idea of a universal theory of population. In some circumstances it may be considered quite rational to encourage reproduction but in many others birth control becomes a rational act. According to Gandhi, in his days, religion favoured a small family and birth control had become a political duty. Some of his committed supporters found his involvement with birth control a little embarrassing, but for Gandhi, the political situation at that time demanded that people avoid any kind of wastage of the vital force,[4] and take up the task of ending colonisation and poverty more seriously. Thus, politics had become a religious activity.

Gandhi made two observations[5]:

(a) "The burden of large families, falls on the middle class; as far as fertility is concerned, it is greater among the middle than the lower classes. If that were not true one would not have the low average of five children per family in India".

(b) Women do not want many children but they cannot resist their husbands. If they could do so without causing bitterness, birth control would be possible in 99 per cent of the cases.

Gandhi was the first person in India to make an observation on the correlation between family size and class. Later, empirical data collected through research studies have confirmed the theoretical validity of his observations. In the pre-transitional stage, fertility in India was certainly nowhere near the biological maxima. A common standard for pre-transitional fertility is taken from the Hutterites, a religious group living in the north-western United States and Canada. They have been a very prosperous group and followed a pronatalist policy[6]. Indian family size in the 1950s was a little more than half their family size in the 1920s. Research has also shown than in India development and modernisation caused a rise in fertility in the early years of the post-Independence period[7].

In observation (a) above, the term "middle class" requires some clarification. In the Gandhian framework, "middle class" is not an income category. It is a class of people who have begun to westernise their life style and serve as go-betweens. They imitate the modern imperialists and control the consciousness of traditional colonial people. Behavioural changes among the members of this class have ensued as a result of modernisation. As such, modernisation leads to a rise in fertility. In the West, this rise was arrested by a simultaneous change in aspirations of social mobility which motivated couples to contol family size. This fertility-depressing effect of modernisation did not operate among the middles classes during the early phases of development.

The main aspect of the Gandhian theory of population is his rejection of artificial birth control methods. In this respect, he is closer to Malthus than to Marx. Except for a brief period during his stay abroad as a student, Gandhi was always against using "external" family planning methods. His commitment to "brahmacharya" (celibacy) was basic. Initially, he used it for the limited purpose of restricting family size but as his thoughts matured, he advocated it essentially for Truth realisation: to follow "brahmacharya" completely, is Truth realisation, said Gandhi. According to him, he had found it experientially and continuously step-by-step[8] and subsequently confirmed it with statements enshrined in religious literature.[9] It may be said that for Gandhi "brahmacharya" in itself, was not a means but a value. According to him, the sole purpose of the reproductive organs was to produce

offspring (of high quality); it was wrong to use them for gratification. From this it also follows that householders can also lead a life of "brahmacharya". To quote: "If a man controls his semen, except on the occasion of such purposeful cohabitation, he is as good as an avowed 'brahmachari'. Just imagine, how many occasions for such cohabitation can there be in a lifetime? In the life of a healthy and virile man or woman, there may be only one such occasion. Why should such persons not be looked upon as avowed "brahmacharis"?[9].

Observation (b) shows that in contemporary society women have lost the force (of soul) to resist their husbands. Population workers should, therefore, concentrate on ways to improve soul-force among women and propagate the value of "brahmacharya" both among men and women.

It may be startling to some and a revelation to others that Gandhi approved sterilisation under certain circumstances. He was of the view that persons suffering from incurable or sexually transmitted diseases and wanted a sterilisation may be permitted[2]. Since he believed that men had generally used women as objects of sex and women were more suited for practicing non-violence and "brahmacharya", he favoured the idea of voluntary (but not compulsory) acceptance of the male operation. Obviously, Gandhi was not a traditionalist. He saw that modernisation could not deliver the goods in this country, nor could tradition—only a revolutionised tradition adapted creatively to changing conditions could solve India's problems[10].

This analysis contradicts the position of Gunnar Myrdal that Gandhi's authority in his times was a strong psychological barrier to the adherence to the view of India's overpopulation. To Myrdal, Gandhi was a radical liberal who denied that India was overpopulated. He derives his position from Gandhi's statement that if all laboured for their bread, there would be no cry of overpopulation, no disease and misery.[11] Myrdal seems to have committed the mistake of looking at Gandhian literature in the thought categories of neo-Malthusianism and modernisation. Gandhi's support to population control was unequivocal and unflinching. His theory of man was however, a holistic one and not one of a "one-dimensional" man.

Implications of the Gandhian theory of social reconstruction for population control

The above points are taken directly from Gandhi's views on population control. Now, let us look at the indirect consequences of the Gandhian programme of social reconstruction for population control. Gandhi wanted India to develop as a world nation, a nation that stands for universal human values, and not one that simply aims to catch-up with powerful countries. He wanted to build a new society based on truth and non-violence. He wanted India to move towards the Kingdom of God, and for Indians, "Ramrajya"

portrays this concept. "Ramrajya" (as defined in various religious works on Rama such as *Rama Charit Manas* of Tulsidas) signifies a state of perfect equality, love, order, happiness, truth, non-violence, and control of the senses. He felt that the establishment of "Ramrajya" would lead to the true welfare of not only the Indian people but of the entire world. He felt that India should be protected to save the world from the vices associated with Western civilisation. "Ramrajya" means gaining control over the horses, symbolising the senses, by the human soul, the charioteer, said Gandhi[9]. The soul that gets carried away by the horses is defeated, and the one that controls the senses lives in "Ramrajya" no matter what the outward circumstances are.

In "Ramrajya", a commitment for Truth is the most cherished value and non-violence provides the framework of normative order. While a modern man uses his creative energies for selfish aims, and to use the Dostoevakian term, suffers from isolation, a man in "Ramrajya" acts largely for the purpose of Truth realisation. But "Ramrajya" was the first order social ideal. The second order ideal or the short run goal for India was to attain political freedom[12]. Political freedom must gradually pave the way for self-rule or "Ramrajya". Here, the meaning of attaining political freedom for Gandhi was the capability of a population to declare itself free at its own will. At a more practical level, for India, it depended on the implementation of a constructive programme in the following thirteen areas: elimination of untouchability; development of Khadi and other village industries; village sanitation; new or basic education; adult education; working for economic equality (which attacks poverty directly); uplift of women (which reduces the preference for sons); education in hygiene and health (which together with sanitation, women's welfare, prohibition, removal of untouchability, and economic equality are relevant to improvements in infant and child mortality); basic and adult education (which lead to reduction in fertility through the spread of education); Hindu-Muslim unity; propagation of "Rashtrabhasha" (national language); and cultivating love for one's own language. Our question is: Had India taken this constructive programme seriously what would its implications have been for population trends?

The constructive programme has obvious links with an effectively implemented fertility control programme in that it is directed to reducing or eliminating such barriers to fertility reduction as poverty, son preference, old age security, high infant and child mortality, poor status of women, low levels of literacy/education, low age at marriage, and resistance to the family planning programme for religious and other reasons[13]. Moreover, the areas indicated in the programme are mutually reinforcing, and success achieved with respect to one or more areas would facilitate success in others. In other words, the application of the Gandhian theory of social transformation would be very conducive to the progress of the family welfare programme in the

Indian context.

Regarding nuptiality, as early as 1925, Gandhi spoke in favour of raising the age at marriage in India. When the Sarda Act was under formulation, Gandhi opted through *Young India* (August 27, 1890): "Any sensible legislation in the direction of raising the age of consent will certainly have my approval". He believed that ordinarily a girl under 18 years should never be given in marriage. Two years later in 1927, he said, "If I could do so, I would lay down 20 as the minimum. Twenty years is early enough even in India"[14]. Had India taken Gandhi seriously on this matter, a statistically significant part of the left tail of the fertility distribution curve would have been truncated.

Gandhi took a keen interest in women's issues too. He tried to change public opinion about the age of marriage, widow remarriage, education of women and equality of status between men and women. But his approach to women's problems was different. There are two aspects of women's status—absolute and relative. The absolute status concerns such measures as literacy and educational achievements, work participation rates, longevity, political awareness and consciousness of rights in general, while the relative status measures women's achievements in relation to those of men. In present-day India we face a contradiction: while objective indices indicate a rise in women's status, atrocities on women, rape, cases of bride burning, etc. are also on the rise. Gandhi laid great importance on developing inner (soul) strength among women than on social engineering.

Even in the pre-colonisation days, girls attended schools and participated in cultural and economic activities. Some were educated at home and they in turn educated their children[15]. Gandhi did not believe that women in rural India were helpless creatures. He felt that they were the real heads of the household and could protect themselves. He wanted women to practice "brahmacharya" and gain strength to say 'no' to their husbands. It would do them no harm. He was convinced that it is only in a society practicing "brahmacharya" that women will not and cannot be treated as objects of sexual gratification. They would also not seek fulfillment in sex and reproduction alone, and would rather participate in the political, social and cultural life of the nation along with men, and realise Truth. Only such a society could be demographically balanced.

Gandhian critique of the Western theory

In his first major book, *Hind Swaraj* Gandhi attacked Western civilisation. He attempted to show that Western values and not the British rule were responsible for India's problems. He observed that Western civilisation is based on greed and materialism, has no purpose, and is unable to solve problems which it has itself created in traditional societies. Only truth and non-violence can redeem contemporary society from the sin of Westernisation.

It was his conviction that beyond a limit, material progress kills moral concerns and thus civilization itself. Supporters of birth control programmes claim that population growth in present-day developing countries slows down the pace of development and therefore population control is conducive to development. For them, the modernisation of developing societies is the goal. But for Gandhi, modernisation and the present processes of development were in themselves faults which developing societies must check.

In 1936, Gandhi said that family planning through artificial methods of birth control may certainly limit population growth to an extent and eliminate the problem of starvation faced by the average man, but the moral harm it does to practicing individuals and society is great. In the Gandhian framework one may think of the following major dysfunctions of using contraception:

1. it may increase coital frequency among married couples, leading to ill-health, loss of vitality, greater incidence of foetal wastage and depression of spirit;
2. it may encourage pre-marital sexual activities leading to the problem of teenage pregnancy;
3. it may cause loss of sacredness and sanctity of marriage;
4. it may lower the image of women in society;
5. it may strengthen the legitimacy of sex as a source of pleasure, leading in the long-run to a questioning of incest taboos, unnatural sex, and sexual abuse; and
6. it may increase the incidence of unwanted births among those who do not have knowledge of or access to such methods.

That Western societies have already undergone the above consequences of contraception is shown by their family and demographic statistics. Although we lack reliable data at the national level, it is felt that in India also traditional and religious restrictions on sex are weakening and coital frequency may be rising. A trend towards the liberalisation of sexual norms can also be noticed. Pornographic material is easily available in cities and the female figure is increasingly being used for advertising various products.

Around 1946, Gandhi wrote that the use of artificial birth control methods is an insult to women. To him, the only difference between a prostitute and a woman using artificial birth control methods was that while a prostitute sells her body to many men the latter does so to only one man. A woman should have such a strong will power that she is not controlled by man; unless the wife wants a baby, the husband should have no right to touch her[2]. He thus saw self-control as a question of the dignity of women, sublimation and self-actualisation.

It may be noted that "brahmacharya" is a eugenic method. According to the well-known Indian medical expert Susruta, diet and the physical and

mental condition of the woman during "samagama" i.e., one month after conception, determine child psychology. Gandhi also emphasised that intercourse during pregnancy is particularly dangerous for the future of mankind.

On "problems" with the Gandhian theory

Critics have levelled various charges at the Gandhian theory in general and the Gandhian theory of population in particular. One charge against his theory is that Gandhi was a bourgeois leader and his theory is an idealist theory. During the freedom struggle he emerged as a great leader of Indian bourgeoise when his political work helped their economic interest. But after independence his theory became an obstacle to their industrial interests and was therefore abandoned[16]. So, Gandhian theory has no political significance now. Another criticism is that while the goals of Gandhian intervention are very clearly defined, the approaches to relative consummation of the values are not clear.

The neo-Malthusianists have appreciated Gandhian theory for the support it lends to the concept of population control but they have criticised it for its rejection of artificial birth control methods. Few people in India know that Malthus himself was a clergyman and consistent with the Christian viewpoint he himself had not accepted artificial birth control methods. Only the followers of Malthus and Nehru, fearful of the perception of the population bomb exploding in less developed countries, became ardent supporters of all means of birth control. To quote Nehru:

In the interest of social economy, family happiness and national planning, family planning and a limited number of children are essential and the state should establish a policy to encourage this. It is desirable to stress the need and to spread knowledge about cheap and safe methods of birth control[17].

It is commonly said that "brahmacharya" as a method of population planning is not practicable. In his convocation speech delivered at the International Institute for Population Sciences, Bombay, Dr. P.N. Srivastava, Member, Planning Commission of Government of India, enunciated that Pandit Nehru is reported to have said that "to limit consideration of birth control on the lines suggested by the first Health Minister, Rajkumari Amrit Kaur was absurd"[18]. Rajkumari Amrit Kaur was a devout disciple of Gandhi, she believed in the Gandhian theory and tried to implement it.

Defense of the Gandhian framework in general is beyond the scope of this paper. Here, we are concerned with the appositeness of the Gandhian theory of population. It may be said that Gandhian theory is like a Kuhnian paradigm which can be applied only in totality. It is impossible to envisage an otherwise "modern" society controlling its size through "brahmacharya".

Gandhi himself saw that man and his environment are dependent on each other, and a man who wishes to change himself must simultaneously attempt to change his environment. For this purpose, he developed the institution of "ashram" (settlement). Gandhi founded several such settlements in his lifetime and each came as a response to a particular practical situation[19].

Gandhi wanted to build a system in which human relationships are based on truth and equality, and which are conducive to the realisation of inter-subjective freedom. That should be the ultimate goal even of a partial implementation of the Gandhian theory. "Brahmacharya" is difficult to practice but not impossible. In a proper environment it may become a highly satisfying activity. As indicated above, Gandhi was not a traditional fundamentalist, and in certain situations he approved of even the most controversial methods such as sterilisation. Gandhi wanted to say that the concept of birth control is not new to Indian Dharmic tradition but in the Dharmic tradition, "brahmacharya", "vanprastha" and "adhilavana" (withdrawal) are the methods of population control. Only those who have failed to train themselves to follow Dharma need artificial methods. They may be allowed to do so but the use of artificial methods must be treated as an index of failure on the part of their users. Upadhyaya said that "those who follow the rules of healthy living and do not easily fall ill, need not go to the hospital, though the state sees to it that hospitals are provided as a matter of course[20]." This is the Gandhian way. Thus in some situations and for some people artificial methods may be allowed but the users must be made to feel that they are not be enjoyed as methods of gratification without reproductive consequences but to be taken as medicine (for consequences of not following the right path).

Further, history shows that the widespread use of artificial birth control methods is not essential for demographic transition. In a large number of countries in the West, fertility started declining even when artificial methods of birth control were either not available or were legally banned. Natural methods were used by married couples to limit family size. Nineteenth century optimism and high social-mobility aspirations were behind the motivation. So, if the Gandhian theory worked under compulsion because artificial methods were not allowed in Europe, it could certainly work in India in a voluntary manner if Westernisation, modern education and media do not distort people's perceptions. Indian religious literature makes several references to population control[21]. In *Mahabharata* when Pandu wanted a fifth child, Kunti said that only donkeys have more than four children. Tulsidas's *Rama Charit Manas* is known for the lines which refer to a large family as a cause of despair. Rama's brothers had two children each. *Srimad Bhagavata Mahatmya* says that in Bharatvarhsa, where only a man can shape his destiny through actions, wives conceive merely once toward the closing year of life[22]. *Manusmriti* (5/159) says that thousands have achieved heaven without

producing a progeny, while *Chanakyaniti* (4/6) maintains that one good son is better than a thousand bad sons. Thus, Gandhi only emphasised what was already a part of Indian tradition, and the fact that Indian tradition is capable of solving India's problems.

Relevance of Gandhian theory to solving India's population problems

Let us first look at the way in which the birth control programme has developed in India. The family planning programme, which is another name for the birth control programme, has stressed that the country is facing a population explosion of crisis dimensions and therefore, people must refrain from producing many children. Thus, family planning is a question of responsible parenthood. The matter of the fact is that not all Indians have known statistics and economic equations nor have they shown any great concern for social responsibility. Then, at the micro level a small family is said to be conducive to material prosperity of the parents themselves and also of their children. But in a rigidly stratified system where the masses lack the basic facilities to develop skills, people see little logic in the argument. It is basically social-mobility aspirations among the better-off section of society and the Malthusian fear among others which have produced some results. In the process, the programme has caused a loss of people's traditional concept of family planning.

In general, the following factors may be identified which are at the root of the population problem:

1. In India, the health programme has been quite successful in achieving a rapid reduction in mortality. No attempt was made to combine health and birth control values, so the health programme worked faster. People were not made to realise that unrestrained longevity may cause more problems than a short lifespan. It has not been said that birth control is a moral duty of all givers and takers of health services. "Brahmacharya's— rules of health, hygiene and sanitation were not given due importance in mortality improvement and birth control programmes. Consequently, we are faced with three problems: inequality with respect to health facilities, mortality improvement without morbidity improvement, and population explosion.

2. Excessive faith in the power of science and technology to improve the material conditions of the nation has led to an undermining of local resources, local skills and local initiative. This situation has killed efficacy. Also, in this situation, men have developed an external locus of control. To quote:

"Modern science and technology is not always used as a brutish tool by the rich and powerful to dispossess the poor. It has also been used subtly to undermine the confidence of the poor in their own resources and resource use patterns. Particularly if a natural resource used traditionally by people

is so widely available that it just cannot be monopolised, every effort is made in the name of scientific progress to discredit that natural resource as archaic and useless. This drive to discredit a resource is undertaken to the extent that even the poor who often have no alternative except to use that resource, look forward to the day when they can do without it[23]."

Although the above was said basically in regard to physical resources, the same can be said about cultural resources. As a matter of fact cultural alienation is both an antecedent and a consequence of changes in physical resource use patterns.

3. Modernisation has brought about major changes in women's position. Among the urban educated, it has improved the objective indices of women's status, e.g. education, legal rights, and participation in socioeconomic and cultural life. Even in rural areas, it has weakened restrictions on their schooling and mobility and raised the age at marriage and so on. But the woman's body is increasingly projected as an instrument of man's pleasure. Also, due to changes in economy women's traditional economic position has been marginalised. So, in a very large segment of the population, women's authority has declined. A large number of surveys have shown that women want a smaller family size than men and report a high incidence of unwanted births. Women in certain communities themselves want to do something to control family size but are so afraid of their husbands' disapproval that they are reluctant even to accept this fact before their husbands and parents.

4. Gandhi had mentioned about villages being reduced to dungheaps[9] but the problem of hygiene and sanitation in villages was never so acute as it is today. Similar is the situation in urban slums. This has hindered the reduction of infant and child mortality, and parents still feel that since child survival involves a risk they should produce more children than desired. Simultaneously, it has become increasingly difficult to reduce child mortality further. The per capita expenditure on what is ultimately delivered to villagers in the name of health facilities is dismal. Quite often the medicines are fake and injurious. The health delivery system in many states of India is very deceptive and inadequate. Nutritional levels are also poor. Thus, the lack of cleanliness exposes villagers to various infectious diseases. It is unfortunate that simple rules of healthy living which could give them better resistance to diseases are not followed, not so much because of lack of money as due to lack of education and co-operation.

5. Development in the country has been associated with such processes that the poor have become pauperised and marginalised leading to deprivation, confusion, chaos and crisis. It has not made them rational and self-conscious. This has harmed the family planning programme in several ways. It has lowered the credibility of communication, killed initiative and aspirations

as mentioned above. And, it has contributed to their stresses, fears and anxiety. The author has observed that in the villages of Uttar Pradesh, when "cases" are brought for "family planning" (sterilisation) to urban centres they are operated and given pain killers and antibiotics for five days. After that nobody cares—if the client needs any medical help after that, he must find his own way.

6. The state has shown no willingness to enter into a dialogue with the religious elite on family planning. It must be realised that the role of the religious elite in some communities is important. The political elite are aware of the importance of the religious factor; they have even used it to promote their political interests but they have not used it to promote progressive and positive values for social reconstruction.

The list of the causes of the population problem may be extended further. The crux of the problem is that economic development in post-independence India has benefitted people at the top more than others. It has expanded the middle class and raised their aspirations, at the same time, marginalising the poor. To sustain (its exploitative character) it has divided society into smaller groups which are encouraged to organise along ethnic lines. The media are projecting women as a repository of love and sex. The poor lack in self-initiative. They expect the government to do everything for them. If they have anywhere organised (as in Kerala), and shown a readiness to change life, they have controlled family size also. Wherever they are made to enjoy dole (as under the IRDP) family planning work suffers. The middle classes still show son preference. The modern elite have used contraception but their function to population control is far less than the dysfunction arising from their support to an industrial economic system which has weakened the cultural props of productivity and creativity among the poor. In some communities, the modern elite, accepting family planning for themselves, have no motivation to diffuse the family planning message among the masses. Also, due to a lack of proper educational work, health and hygiene have suffered and morbidity and mortality levels have shown resistance to change. This again is a major obstacle in achieving demographic transition.

In sum, the following are the lessons which emerge from the examination of the Gandhian theory of population:

1. In the present-day circumstances, Indians should control population.
2. The main purpose of population control is political, that is to end poverty, starvation, isolation (in the Dostoevskian sense), exploitation and unequal social relations and promote equity and justice.
3. The method of population control should be such that it prepares man to fight for political equality and takes him toward Truth realisation.

"Brahmacharya" is this method. Universal love and non-exploitation require practice of "Brahmacharya"[24].

4. Those (males or females) who cannot control themselves may accept sterilisation. "Brahmacharya" is the goal that people must gradually approach according to their limitations.
5. The present unacceptable situation has come about due to colonial industrial modernisation. We should revolutionise tradition to save us from the perils of modern civilisation.
6. Experiments must be conducted in "Brahmacharya". It should change public opinion in favour of population control, and may help build "ashrams" for the successful practice of "Brahmacharya", and for preparing some to propagate it.

Many spacing (non-terminal) methods are new. They were not used in those days. It may be said that if Gandhi had approved of sterilisation in some situations, he would have approved of spacing methods also. However, it must be kept in mind, as mentioned earlier, that not Nirodh (condom) but nirodh (control) of desires is the path to ending political inequality at the societal level, and Truth realisation at the personal level. Contraception seems to help society in solving the population crisis but its abuse damages those moral and spiritual qualities which are necessary to establish Sorokin's ideational society. The "nirodh" (control) of desires is the way to it.

In conclusion it may be said that while Malthusian theory focuses on the consequences of population growth and Marxian theory focuses on the causes of "surplus" population[25], Gandhian theory stresses the relationship between the method of population control and the "correct" political action. Population growth may be checked in several ways but only one of them is conducive to the construction of a good society, and that is "Brahmacharya".

REFERENCES

1. Iyer, R.: *The Moral and Political Writings of Mahatma Gandhi*, Vol. 2, Clarendon Press, Oxford, 1986.
2. Ramnath, Suman (ed.): *Samaj Sudhar: Samasyayen aur Samadhan*, Gandhi Sahitya Prakashan, Allahabad, 1969.
3. Sharma, A.K., *Issues in Social Demography*, Mittal Publications, New Delhi, 1989.
4. Desai, M.: *Day-to-Day with Gandhi*, Sarva Seva Sangh Prakashan, Varanasi, 1973.
5. Sanger, Margaret" "A Summit Meeting on Birth Control", in Cousins Norman (ed), *Profiles of Gandhi: America Remembers a World Leader*, Indian Book Company, New Delhi, 1969.
6. Cassen, R.H.: *India: Population, Economy, Society*, The MacMillan Press, Hong Kong, 1978.

7. Srinivasan, K.: "Has modernisation increased fertility in Karnataka India?", *Demography India*, 15 (2): 281 (1986).
8. Gandhi, M.K. : *Satya ke Prayoga*, Nav Jivan Prakashan Mandir, Ahmedabad, 1957.
9. Gandhi, M.K. : *Collected Works of Mahatma Gandhi*, Ministry of Information and Broadcasting, New Delhi, 44: 68 (1971).
10. Maitra, P.: *Population, Technology and Development: A Critical Analysis*, Gower Publishing House, 1986.
11. Myrdal, G. : *Asian Drama: An Inquiry into the Poverty of Nations*, Vol. III, Penguin Books, 1968.
12. Bandopadhyay, J. : *Social and Political Thought of Gandhi*, Allied Publishers, New Delhi, 1969.
13. Sharma, A.K. : "Growth of Muslim population in India: Some policy issues", *The Eastern Anthropologist*, 42(4): 353 (1989).
14. Dubey, B.R. : "Gandhi's Views on Status of Women", in Biswas S.C. (ed.), *Gandhi: Theory and Practice, Social Impact and Contemporary Relevance*, Indian Institute of Advanced Study, Shimla, 1969.
15. Dharampal : *The Beautiful Tree: Indigenous Indian Education in Eighteenth Century*, Biblia Impex Private Limited, New Delhi, 1983.
16. Namboodiripad, E.M.S. : *The Mahatma and the Ism*, People's Publishing House, New Delhi, 1959.
17. Lala, E.S. : "Nehru's vision of women, development and family planning", *The Journal of Family Welfare*, 35(6): 3 (1989).
18. Srivastava, P.N. : "Convocation Address". *IIPS Newsletter*, 30(3): 2 (1989).
19. Chatterjee, Margaret : *Gandhi's Religions Thought*, The MacMillan Press Ltd., New Delhi, 1983.
20. Upadhyay, D. : "The family planning policy", in Daswani, P.R. (ed.), *Issues of National Policy*, Jaico Publishing Company, Bombay, 1969.
21. Ojha, S.D. : "Prachin Bhartiya parampara aur janasankhya shiksha", in Misra, B.D. et al (eds.), *Janasankhya Shiksha*, 1987.
22. Goswami, C.L. and Sastri, M.A. : *Srimad Bhagavata Mahapurana*, Gita Press, Gorakhpur, 1982.
23. Agarwal, A. : *Politics of Environment*, *Gandhi Marg*, 87:137 (1986).
24. Dhawan, G. : *Sarvodaya Tatva Darshan*, Nav Jivan Prakashan Mandir, Ahmedabad, 1963.
25. Sharma, A.K. : "Aspects of population debate and stratification", *The Journal of Family Welfare*, 31(1): 37 (1984).

SOCIAL MOBILITY AND FAMILY PLANNING PRACTICES IN RURAL BANGLADESH - A CASE STUDY

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INTRODUCTION

The necessity of controlling the growth of population in Bangladesh was seriously recognised as early as 1965 when a large-scale national family planning programme was initiated in erstwhile Pakistan[1]. The Government of Bangladesh also gave top priority to the population control programme as an integral part of the development process by adopting a comprehensive population policy[2] and took various steps for the efficient implementation of family planning services. Family planning was considered to be a remedy for achieving the national objective of zero population growth.

The acceptance of family planning is known to be influenced by social factors, among others. Among the different social factors, education exerts a profound effect on family planning acceptance and fertility, as has been observed in many studies[3-5] both at home and abroad. It is usually maintained that education not only provides opportunities for personal advancement and awareness of social mobility but it also provides a new outlook, freedom from tradition, the willingness to analyse institutions, values and patterns of behaviour and the growth of rationalism[6]. In a separate study, Bhuyan[7] observed that a significant proportion of literate persons had acquired an upper status in society, and that substantial upward social mobility was associated with an increase in the level of education. In another study, Bhuyan and Ahmed[4] observed that both literate and illiterate people were aware of family planning services, and that increasing the level of education along with the availability of family planning services can go a long way in depressing fertility and widening the practice of contraception.

OBJECTIVES

It is extremely difficult to attribute changes in fertility behaviour and family planning practices to a single factor like education, there being a whole complex of factors intricately meshed together affecting the motivation of couples to adopt family planning. Therefore, it was considered worthwhile to study the family planning behaviour of couples by analysing their social mobility pattern. In this paper, an attempt has been made to study family

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planning behaviour of couples by their educational and occupational status by analysing the changes in these factors among their parents.

DATA AND METHODOLOGY

The present study was based on data obtained from a survey on a case study of the socio-economic condition of rural people in Bangladesh. The study was conducted in Sudharam Upazila under Noakhali district which has 87752 households in 285 villages under 18 unions. The data was collected from households which were selected by two-stage random sampling. At the first stage, three unions were selected randomly and from among these, ten per cent villages were selected at random. The number of selected villages was four. All the households, numbering 1180, from the selected villages were covered. General information relating to the socio-economic situation was collected from the head of the households, and information on family planning practice was obtained from married couples of childbearing age that is with the wife aged below 50 years. Data was collected through a questionnaire designed for the purpose and by face-to-face conversations with the respondents. In all, 1250 couples were interviewed. Thus, the present analysis is based on the information collected from 1250 observations and concerns the social mobility of female respondents (wives) and their family planning behaviour.

RESULTS AND DISCUSSION

A high rate of acceptance of family planning depends, among other factors, on an awareness of the need for family planning and its knowledge. This awareness, along with social and economic pressures, would encourage couples to adopt family planning. In our sample, all the couples were aware of the necessity for planning the family. However, only about 22 per cent (Table 1) were practicing family planning. The rate of adoption was higher among educated respondents, and increased with their educational level as is evident from Table 1. The differential in the rate of adoption was highly significant [p $(x^2 > 89.6) < .01$ with d.f.=2].

Further, acceptance of family planning increased not only with increasing levels of education of the respondents and their husbands, but also with that of their fathers-in-law (Table 2, Panel A). The latter effect was found to be more profound than that exerted by the husband's education.

The differential family planning acceptance rate among respondents with increasing levels of education of the father-in-law was highly significant [p $(x^2 > 35.5) < .01$ with d.f.=4]. A highly significant differential rate of adoption [p $(x^2 > 61.8) < .01$ with d.f.=2] was also observed among respondents whose mothers-in-law had a secondary level or higher education (Table 2, Panel B). The findings support the view that the educational

TABLE 1

Respondent's education by husband's education and family planning practice

Respondent's educational level	Adopted family planning	Husbands' educational level: Illiterate	Primary	Secondary and above	Total
Illiterate	Yes	38 (15.1)	18 (18.4)	11 (21.2)	67 (16.7)
	No	213 (84.9)	80 (81.6)	41 (78.8)	334 (83.3)
	(N)	251 (100.0)	98 (100.0)	52 (100.0)	401 (100.0)
	(%)	62.6	24.4	13.0	32.1
Primary	Yes	7 (17.9)	76 (16.3)	61 (43.0)	144 (22.2)
	No	32 (82.1)	391 (83.7)	81 (57.0)	504 (77.8)
	(N)	39 (100.0)	467 (100.0)	142 (100.0)	648 (100.0)
	(%)	6.0	72.1	21.9	51.8
Secondary and above	Yes	4 (22.2)	21 (18.8)	33 (46.5)	58 (28.9)
	No	14 (77.8)	91 (81.2)	38 (53.5)	143 (71.1)
	(N)	18 (100.0)	112 (100.0)	71 (100.0)	201 (100.0)
	(%)	9.0	55.7	35.3	16.1
Total	Yes	49 (15.9)	115 (17.0)	105 (39.6)	269 (21.5)
	No	259 (84.1)	562 (83.0)	160 (60.4)	981 (78.5)
	(N)	308 (100.0)	677 (100.0)	265 (100.0)	1250 (100.0)
	(%)	24.6	54.2	21.2	100.0

Figures in brackets denote percentages.

level of the mother-in-law is more conducive to family planning acceptance by the respondent (daughter-in-law), compared to that of her father-in-law: 51.1 percent compared to 47.8 per cent respectively. Thus, more than half of the respondents who had received secondary or higher education and had mothers-in-law who also had a similar educational status, were practising family planning.

Table 3 presents the differential rates of family planning adoption by both literate and illiterate women by the educational level of their fathers (Panel A) and mothers (Panel B).

The differentials in family planning adoption rates at different levels of education of both the women and their fathers were highly significant as $p\,[x^2 > 11.7) < .01$; d.f. $=2$]. Likewise, adoption differentials of both the women and their mothers were highly significant as $p\,[x^2 > 45.7) < .01$ with d.f. $=2$]. Women with parents with secondary or higher levels of education tended to adopt family planning due to the higher educational levels of

TABLE 2

Respondent's education by father-in-law's and mother-in-law's education and by family planning practice

Respondent's educational level	Adopted family planning	Illiterate	Primary	Secondary and above	Total
A. *Father-in-law's educational level*					
Illiterate	Yes	20 (10.1)	26 (19.0)	21 (31.8)	67 (16.7)
	No	178 (89.9)	111 (81.0)	45 (68.2)	334 (83.3)
	(N)	198 (100.0)	137 (100.0)	66 (100.0)	401 (100.0)
	(%)	49.4	34.2	16.4	32.1
Primary	Yes	26 (13.6)	34 (14.5)	84 (37.8)	144 (22.2)
	No	165 (86.4)	201 (85.5)	138 (62.2)	504 (77.8)
	(N)	191 (100.0)	235 (100.0)	222 (100.0)	648 (100.0)
	(%)	29.5	36.3	34.2	51.8
Secondary and above	Yes	20 (24.1)	19 (30.6)	11 (47.8)	58 (28.9)
	No	88 (75.9)	43 (69.4)	12 (52.2)	143 (71.1)
	(N)	116 (100.0)	62 (100.0)	23 (100.0)	201 (100.0)
	(%)	57.7	30.8	11.5	51.8
Total	Yes	74 (14.7)	79 (18.2)	116 (37.3)	269 (21.5)
	No	431 (85.3)	355 (81.8)	195 (62.7)	981 (78.5)
	(N)	505 (100.0)	434 (100.0)	311 (100.0)	1250 (100.0)
	(%)	40.4	34.7	24.9	100.0
B. *Mother-in-law's educational level*					
Illiterate	Yes	57 (16.2)	7 (18.4)	3 (25.0)	67 (16.7)
	No	294 (83.8)	31 (81.6)	9 (75.0)	334 (83.3)
	(N)	351 (100.0)	38 (100.0)	12 (100.0)	401 (100.0)
	(%)	87.5	9.5	3.0	32 1
Primary	Yes	111 (21.0)	17 (23.6)	16 (34.0)	144 (22.2)
	No	418 (79.0)	55 (76.4)	31 (66.0)	504 (77.8)
	(N)	529 (100.0)	72 (100.0)	47 (100.0)	648 (100.0)
	(%)	81.6	11.1	7.3	51.8
Secondary and above	Yes	15 (15.6)	19 (32.8)	24 (51.1)	58 (28.9)
	No	81 (84.4)	39 (67.2)	23 (48.9)	143 (71.1)
	(N)	96 (100.0)	58 (100.0)	47 (100.0)	201 (100.0)
	(%)	47.8	28.8	23.4	16.1
Total	Yes	183 (18.8)	43 (25.6)	43 (40.6)	269 (21.5)
	No	793 (81.2)	125 (74.4)	63 (59.4)	981 (78.5)
	(N)	976 (100.0)	168 (100.0)	106 (100.0)	1250 (100.0)
	(%)	78.1	13.4	8.5	100.0

Figures in brackets denote percentages.

TABLE 3

Respondent's education by father's and mother's education by family planning practice

Respondent's educational level	Adopted family planning	Illiterate	Primary	Secondary and above	Total
A. Father's educational level					
Illiterate	Yes	49 (16.0)	14 (18.4)	4 (21.1)	67 (16,7)
	No	257 (84.0)	62 (81.6)	15 (78.9)	334 (83.3)
	(N)	306 (100.0)	76 (100.0)	19 (100.0)	401 (100.0)
	(%)	76.3	19.0	4.7	32.1
Primary	Yes	95 (19.8)	19 (23.5)	30 (34.9)	144 (22.2)
	No	386 (80.2)	62 (76.5)	56 (65.1)	504 (77.8)
	(N)	481 (100.0)	81 (100.0)	86 (100.0)	648 (100.0)
	(%)	74.2	12.5	13.3	51.8
Secondary and above	Yes	26 (24.1)	11 (25.6)	21 (42.0)	58 (28.9)
	No	82 (75.9)	32 (74.4)	29 (58.0)	143 (71.1)
	(N)	108 (100.0)	43 (100.0)	50 (100.0)	201 (100.0)
	(%)	53.7	21.4	24.9	16.1
Total	Yes	170 (19.0)	44 (22.0)	55 (35.5)	269 (21.5)
	No	725 (81.0)	156 (78.0)	100 (64.5)	981 (78.5)
	(N)	895 (100.0)	200 (100.0)	155 (100.0)	1250 (100.0)
	(%)	71.6	16.0	12.4	100.0
B. Mother's educational level					
Illiterate	Yes	63 (16.8)	3 (16.7)	1 (12.5)	67 (16.7)
	No	312 (83.2)	15 (83.3)	7 (87.5)	334 (83.3)
	(N)	375 (100.0)	18 (100.0)	8 (100.0)	401 (100.0)
	(%)	93.5	4.5	2.0	32.1
Primary	Yes	119 (21.8)	15 (22.4)	10 (27.8)	144 (22.2)
	No	426 (78.2)	52 (77.6)	26 (72.2)	504 (77.8)
	(N)	545 (100.0)	67 (100.0)	36 (100.0)	648 (100.0)
	(%)	84.1	10.3	5.6	51.8
Secondary and above	Yes	6 (9.2)	24 (30.8)	28 (48.3)	58 (28.9)
	No	59 (90.8)	54 (69.2)	30 (51.7)	143 (71.1)
	(N)	65 (100.0)	78 (100.0)	58 (100.0)	201 (100.0)
	(%)	32.3	38.8	28.9	16.1
Total	Yes	188 (19.1)	42 (25.8)	39 (38.2)	269 (21.5)
	No	797 (80.9)	121 (74.2)	63 (61.8)	981 (78.5)
	(N)	985 (100.0)	163 (100.0)	102 (100.0)	1250 (100.0)
	(%)	78.8	13.0	8.2	100.0

Figures in brackets denote percentages.

their fathers-in-law and mothers-in-law. Thus, the mother's educational level had a greater positive effect on family planning adoption than the father's. About 48.3 per cent of respondents whose mothers had received secondary or higher education had adopted family planning compared to 42.0 per cent of whose fathers had received a similar education. The findings thus support the view that education provides an appropriate environment to evaluate a situation more objectively and that educated couples from educated families are far more receptive to the idea of family planning than others.

Since family planning acceptance increased significantly with an increase in the educational levels of both the respondents themselves and their parents, it was of interest to study how many of them had been encouraged to accept family planning by their husbands and fathers-in-law who were educated, or in other words how many of them had upward social mobility in respect of education which had influenced their family planning behaviour. Table 4 presents the family planning acceptance rate in relation to different educational levels of both husbands and fathers-in-law.

About 40 per cent of the respondents had illiterate fathers-in-law. However, 60 per cent of the illiterate fathers had educated their sons at least up to the primary level. Most of the educated fathers too had provided a primary education to their sons. The proportion of illiterate sons decreased significantly as the fathers' educational level increased. Thus, upward social mobility in respect of education of both parents and offspring was significant. Educated fathers tried to ameliorate their social status by arranging the marriage of their sons with educated girls, and so, with an increase in the father's level of education, the couple's educational level tended to move upwards. This upward trend was also observed in the case of the mother-in law's education (Table 5). Of course, most of them were illiterate. However, those who were educated were more amenable to educating their sons and educated mothers-in-law ameliorated their social status by getting educated daughters-in-law.

The amelioration in social status was also observed in respect of family planning adoption among educated families. As the educational level of the respondents, their husbands and fathers-in-law increased, so did family planning acceptance. While family planning acceptance by educated respondents increased significantly with an increase in both the husbands' and fathers-in-law's education as p[($x^2 > 20.6$) $<$ .01 with 2 d.f], that of illiterate respondents also increased though not significantly. Again, acceptance rates among educated respondents increased significantly increased with increasing levels of education of both husbands and mothers-in-law [p ($x^2 > 39.9$) $<$ .01 with d.f.=2]. Thus, upward social mobility in respect of education did seem to motivate couples to practice family planning.

As educational levels of both the parents and their children rise, so also

TABLE 4

Respondent's education by father-in-law's and husband's educational levels, and by family planning practice

Respondent's educational level	Adopted family planning	Father-in-law's educational level: Illiterate — Husband's education: Illiterate	Illiterate — Primary	Illiterate — Secondary and above	Primary — Husband's education: Illiterate	Primary — Primary	Primary — Secondary and above	Secondary and above — Husband's education: Primary	Secondary and above — Secondary and above	Total
Illiterate	Yes	17(10.9)	1(5.6)	2(8.3)	21(22.1)	4(11.1)	1(16.7)	13(29.5)	8(36.4)	67(16.7)
	No	139(89.1)	17(94.4)	22(91.7)	74(77.9)	32(88.9)	5(83.3)	31(70.5)	14 (63.6)	334(83.3)
	(N)	156(100.0)	18(100.0)	24(100.0)	95(100.0)	36(100.00)	6(100.0)	44(100.0)	22(100.0)	401(100.0)
	%	78.8	9.1	12.1	69.3	26.3	4.4	66.7	33.3	32.1
Primary	Yes	5(27.8)	12(8.1)	9(37.5)	2(9.5)	30(14.6)	2(25.0)	34(30.4)	50(45.5)	144(22.2)
	No	13(72.2)	137(91.9)	15(62.5)	19(90.5)	176(85.4)	6(75.0)	78(69.6)	60(54.5)	504(77.8)
	(N)	18(100.0)	149(100.0)	24(100.0)	21(100.0)	206(100.0)	8(100.0)	112(100.0)	110(100.0)	648(100.0)
	%	9.4	78.0	12.6	8.9	87.7	3.4	50.5	49.5	51.8
Secondary and above	Yes	4(50.0)	18(20.7)	6(28.6)	—	2(10.0)	17(53.1)	1(20.0)	10(55.6)	58(28.9)
	No	4(50.0)	69(79.3)	15(71.4)	10(100.0)	18(90.0)	15(46.9)	4(80.0)	8(44.4)	143(71.9)
	(N)	8(100.0)	87(100.0)	21(100.0)	10(100.0)	20(100.0)	32(100.0)	5(100.0)	18(100.0)	201(100.0)
	%	6.9	75.0	18.1	16.1	32.3	51.6	21.7	78.3	16.1
Total	Yes	26(14.3)	31(12.2)	17(24.6)	23(18.3)	36(13.7)	20(43.5)	48(29.8)	68(45.3)	269(21.5)
	No	156(85.7)	223(87.8)	52(75.4)	103(81.7)	226(86.3)	26(56.5)	113(70.2)	82(54.7)	981(78.5)
	(N)	182(100.0)	254(100.0)	69(100.0)	126(100.0)	262(100.0)	46(100.0)	161(100.0)	150(100.0)	1250(100.0)
	%	36.6	50.3	13.7	29.0	60.4	10.6	51.8	48.2	
	% of N=1250	14.6	20.3	5.5	10.1	20.9	3.7	12.9	12.0	

Respondent's education by mother-in-law's and husband's educational levels, and by family planning practice

Respondent's educational level	Adopted family planning	Mother-in-law's educational level								Total
		Illiterate			Primary			Secondary and above		
		Husband's educational level			Husband's educational level			Husband's educational level		
		Illiterate	Primary	Secondary and above	Illiterate	Primary	Secondary and above	Primary	Secondary and above	
Illiterate	Yes	37(15.1)	15(20.0)	5(16.1)	1(16.7)	3(16.7)	3(21.4)	—	3(42.9)	67(16.7)
	No	208(84.9)	60(80.0)	26(83.9)	5(83.3)	15(83.3)	11(78.6)	5(100.0)	4(57.1)	334(83.3)
	(N)	245(100.0)	75(100.0)	31(100.0)	6(100.0)	18(100.00)	14(100.0)	5(100.0)	7(100.0)	401(100.0)
	%	69.8	21.4	8.8	15.8	47.4	36.8	41.7	58.3	32.1
Primary	Yes	6(20.0)	69(16.2)	36(48.6)	1(11.1)	40(16.0)	12(31.6)	3(17.7)	13(43.3)	144(22.2)
	No	24(80.0)	356(83.8)	38(51.4)	8(88.9)	21(84.0)	26(68.4)	14(82.4)	17(56.7)	504(77.8)
	(N)	30(100.0)	425(100.0)	74(100.0)	9(100.0)	25(100.0)	38(100.0)	17(100.0)	30(100.0)	648(100.0)
	%	5.7	80.3	14.0	12.5	34.7	52.8	36.2	63.8	51.8
Secondary and above	Yes	3(25.0)	11(13.8)	1(25.0)	1(16.7)	4(22.2)	14(41.2)	6(42.9)	18(54.5)	58(28.9)
	No	9(75.0)	69(86.2)	3(75.0)	5(83.3)	14(77.8)	20(58.8)	8(57.1)	15(45.5)	143(71.1)
	(N)	12(100.0)	80(100.0)	4(100.0)	6(100.0)	18(100.0)	34(100.0)	14(100.0)	33(100.0)	201(100.0)
	%	12.5	83.3	4.2	10.3	31.0	58.7	29.8	70.2	16.1
Total	Yes	46(16.0)	95(16.4)	42(38.5)	3(14.3)	11(18.0)	29(33.7)	9(25.0)	34(48.6)	269(21.5)
	No	241(84.0)	485(83.6)	67(61.5)	18(85.7)	50(82.0)	57(66.3)	27(75.0)	36(51.4)	981(78.5)
	(N)	287(100.0)	580(100.0)	109(100.0)	21(100.0)	61(100.0)	86(100.0)	36(100.0)	70(100.0)	1250(100.0)
	%	29.4	59.5	11.2	12.5	36.3	51.2	34.0	66.0	
	% of N=1250	23.0	46.4	8.7	01.7	4.9	6.9	2.9	5.6	

Figures in brackets denote percentages.

does their occupational pattern. Educated members in any family are more or less engaged in respectable professions. Traditional agricultural families also try to educate their dependents in the hope of obtaining respectable positions in society in respect of both education and occupation. Again, parents engaged in respectable professions (which require certain educational qualifications), want their children to be well-placed in society like themselves. In our sample, the sons of about 57 per cent of the husbands whose fathers were businessmen, were engaged in service. The differentials in the proportions of the occupations of both fathers and sons were highly significant [p (x^2 > 484.9) < .01 with d.f. =9]. Thus there was upward social mobility in respect of occupation as well. Over time, most of the families changed their occupations and moved towards business or white-collar jobs.

The effect of upward occupational mobility on family planning acceptance was also studied. With a change in the occupational pattern, family planning acceptance seemed to follow a positive direction. In families with occupations other than agriculture, the adoption rate was higher (Table 6).

Thus, respondents from families engaged in service (42 per cent) were more inclined to adopt family planning than those engaged in business (36 per cent), agriculture (17 per cent) or other professions (22 per cent). The differentials in adoption rates with different occupational patterns was highly significant as [p (x^2 ≥ 32.9) < .01 with d.f. =3]. Thus, upward social mobility in respect of occupation was observed to exert a profound effect on family planning adoption.

As evident from Table 7, the occupation of the woman (respondents) markedly influenced family planning acceptance. Seventy per cent of the respondents engaged in service had adopted family planning compared to 19 per cent and 24 per cent of those who were housewives and engaged in other economic activities respectively. Women who worked outside the home thus showed a greater tendency to plan their families. The differentials in family planning adoption rates of the respondents due to changes in both the husband's and her own occupation were highly significant as [p−x^2 ≥ 72.3) < .01 with d.f. =3].

Table 7 further indicates that the differentials in family planning adoption by the father-in-law's occupational pattern were were also highly significant [p (x^2 > 98.8) < .01 with d.f. =3]. Fathers-in-law who were engaged in business and service acquired a new outlook and were free from traditional concepts of family life. As a result, their daughters-in-law were more inclined to adopt family planning. The mothers-in-law of all the respondents were housewives, and therefore the impact of their occupation of mothers'-in-law on family planning adoption by the daughter-in-law could not be studied. Nevertheless, the findings do reveal that a socially well-placed

TABLE 6

Respondent's education by father-in-law's occupation, and by family planning practice

Occupation	Adopted family planning	Father-in-law's occupation: Agriculture	Business	Service	Other	Total
Agriculture	Yes	50(9.7)	1(6.7)	1(10.0)	30(18.7)	82(11.7)
	No	463(90.3)	14(93.3)	9(90.0)	130(81.3)	616(-88.3)
	(N)	513(100.0)	15(100.0)	10(100.0)	160(100.0)	698(100.00)
	(%)	67.5	13.0	13.0	53.7	55.8
Business	Yes	5(22.7)	24(36.4)	3(13.6)	6(24.0)	38(28.1)
	No	17(77.3)	42(63.6)	19(86.4)	19(76.0)	97(71.9)
	(N)	22(100.0)	66(100.0)	22(100.0)	25(100.0)	135(100.0)
	(%)	2.9	57.4	28.6	8.4	10.8
Service	Yes	67(39.9)	12(54.5)	24(63.2)	14(40.0)	117(44.5)
	No	101(60.1)	10(45.5)	14(36.8)	21(60.0)	146(55.5)
	(N)	168(100.0)	22(100.0)	38(100.0)	35(100.0)	263(100.0)
	(%)	22.1	19.1	49.1	11.7	21.0
Other	Yes	8(14.0)	5(41.7)	4(57.1)	15(19.2)	32 (20.8)
	No	49(86.0)	7(58.3)	3(42.9)	63(80.8)	122(79.2)
	(N)	57(100.0)	12(100.0)	7(100.0)	78(100.0)	154(100.0)
	(%)	7.5	10.5	9.1	26.2	12.4
Total	Yes	130(71.1)	42(36.5)	32(41.6)	65(21.8)	269(21.5)
	No	630(82.9)	73(63.5)	45(58.4)	233(78.2)	981(78.5)
	(N)	760(100.0)	115(100.0)	77(100.0)	298(100.0)	1250(100.0)
	(%)	68.8	9.2	6.2	23.8	

Figures in brackets denote percentages.

TABLE 7

Respondent's occupation by husband's and father-in-law's occupation, and by family planning practice

A. Husband's occupation

Respondent's occupation	Adopted family planning	Type of occupation				Total
		Agriculture	Business	Service	Other	
Housewife	Yes	72(12.4)	29(53.7)	39(37.1)	10(14.7)	150(18.6)
	No	509(87.6)	25(46.3)	66(62.9)	58(85.3)	658(81.4)
	(N)	581(100.0)	54(100.0)	105(100.0)	68(100.0)	808(100.00)
	(%)	83.2	40.0	39.9	44.2	64.6
Service	Yes	—	2(66.7)	15(75.0)	2(50.0)	8(29.6)
	No	—	1(33.3)	5(25.0)	2(50.0)	8(29.6)
	(N)	—	3(100.0)	20(100.0)	4(100.0)	27(100.0)
	(%)	—	2.2	7.6	2.6	2.2
Other	Yes	10(8.5)	7(9.0)	63(45.6)	20(24.4)	100(24.1)
	No	107(91.5)	71(91.0)	75(54.4)	62(75.5)	315(75.9)
	(N)	117(100.0)	78(100.0)	138(100.0)	82(100.0)	415(100.0)
	(%)	16.8	57.8	52.5	53.2	33.2
Total	Yes	82(11.7)	38(28.1)	117(44.5)	32(20.8)	269(21.5)
	No	616(88.3)	97(71.9)	146(55.5)	122(79.2)	981(78.5)
	(N)	698(100.0)	135(100.0)	263(100.0)	154(100.0)	1250(100.0)
	(%)	55.8	10.8	21.0	12.4	

B. Father-in-law's occupation

Housewife	Yes	111(19.1)	20(30.8)	6(18.7)	13(10.1)	150(18.6)
	No	471(80.9)	45(69.2)	26(81.3)	116(89.9)	658(81.4)
	(N)	582(100.0)	65(100.0)	32(100.0)	129(100.0)	808(100.00)
	(%)	72.0(76.6)	8.0(56.5)	4.0(41.5)	16.0(43.3)	64.6
Service	Yes	2(66.7)	3(60.0)	12(80.0)	2(50.0)	19(70.1)
	No	1(33.3)	2(40.0)	3(20.0)	2(50.0)	8(29.6)
	(N)	3(100.0)	5(100.0)	15(100.0)	4(100.0)	27(100.0)
	(%)	11.1(0.4)	18.5(4.3)	55.6(19.5)	14.8(1.3)	2.2
Other	Yes	17(9.7)	19(42.2)	14(46.7)	50(30.3)	100(24.1)
	No	158(90.3)	26(57.8)	16(53.3)	115(69.7)	315(75.9)
	(N)	175(100.0)	45(100.0)	30(100.0)	165(100.0)	415(100.0)
	(%)	42.2(23.0)	10.8(39.2)	7.2(39.8)	55.4(32.2	
Total	Yes	130(71.1)	42(36.5)	32(41.6)	65(21.8)	269(21.5)
	No	630(82.9)	73(63.5)	45(58.4)	233(78.2)	981(78.5)
	(N)	760(100.0)	115(100.0)	77(100.0)	298(100.0)	1250(100.0)
	(%)	68.8	9.2	6.2	23.8	

Figures in brackets denote percentages.

female is more likely to adopt family planning.

CONCLUSION

The achievement of the desired level of fertility may be best judged by the extent to which family planning has found its place as a way of life in society. Of course, family planning involves both a decision about the desired family size and the effective limitation of fertility once that size has been reached. In both these matters, social factors play a significant role. Among the social factors, education provides opportunities to a person to be well-placed in society. This study throws some light on the acceptance of family planning by couples who are educated and well-placed in society.

It concludes that every couple in the rural area is aware of family planning, but very few practice it. Most adopter couples were socially well-placed. The rate of adoption was higher among couples from higher (secondary or higher educated females. An upward trend in the educational levels of both fathers-in-law and mothers-in-law had a profound effect upon family planning adoption by their daughters-in-law. Thus, upward social mobility in respect of education of both parents and offspring was significant and family planning practice was significantly positively correlated with it. The acceptance of family planning among illiterate respondents also increased with an increase in the educational levels of both their husbands and fathers-in-law.

Education provides opportunities to be well-placed in the society as educated families tend to be engaged in more socially respected occupations or professions. Thus, with a change in the educational levels of the parents, the occupational pattern of the offspring also changes. It was observed from that over time, most of the families had made substantial changes in society in respect of their profession. This upward social mobility in respect of occupation had a significant positive effect upon family planning adoptionw which was observed to be significantly higher among couples who were engaged in service or business as opposed to those engaged in agriculture or other occupations. Alsi, upward social mobility of the woman made her more inclined to adopt family planning.

REFERENCES

1. LSirageldin, I., Hossain, M., Caine, M.: "Family planning in Bangaldesh : An empirical investigation", *The Bangladesh Development Studies*. 3:1 (1975).
2. Ministry of Health and Family Planning: Maternal Health and Family Planning. "Population Policy", Ministry of Health and Family Planning, Government of Bangladesh. June 1976.
3. Driver, E.D.: *Differential Fertility in Central India*, Princeton University, Princeton, 1963.

3. Driver, E.D.: *Differential Fertility in Central India*, Princeton University, Princeton, 1963.
4. Bhuyan, K.C. and Ahmed, M.U.: "Fertility and family planning practices in rural Bangladesh", *The Journal of Family Welfare*, XXX(3): 57 (1984).
5. Choudhury, R.H.: "Education and fertility in Bangladesh", *The Bangladesh Development Studies*, 5(1): 81 (1977).
6. Dandekar, K. "Effect of Education on Fertility". In *Proceedings of the World Population Conference*, Vol. IV, 1965.
7. Bhuyan, K.C.: "Social workers and rural development", *Administrative Science Review*, 9:1 (1979).

FERTILITY IN THE KOL TRIBE OF MADHYA PRADESH

DR. G.D. PANDEY*

INTRODUCTION

Among all the states of India, Madhya Pradesh has the largest population of tribals: about one-fourth of the country's total tribal population. The different tribal groups show considerable variation in population size, level of development, acculturation and assimilation. Their social and cultural traits, religious beliefs and norms as well as traditional economic pursuits vary from tribe to tribe and area to area. Studies conducted at this Centre have shown variability among the demographic characteristics of various tribes in the state and have recommended a district level approach or a community or group wise approach for health and family welfare planning for them [1,2,3]. Studies have also shown that the fertility level among the tribals is lower than that among other societies inhabiting the same eco-system.

The Kol tribe is one of the tribes of Madhya Pradesh which has been observed to stagnate or decline in size over time. Census data indicate that the growth rate of the Kol population in Madhya Pradesh has declined from 3.96 per cent in 1961-71 to 0.81 per cent during 1971-81. The phenomenon may be associated with a number of factors such as demographic, socio-cultural, medical and so on. Also, this declining trend of population growth has sometimes led to the argument that family planning programmes are not necessary in such societies and therefore, no targets should be set for these populations. These incongruities need to be resolved by a careful study of factors such as fertility, mortality, migration, family planning and their association with the socio-cultural practices prevailing in the population. It is in this context, that an attempt has been made to study fertility levels in Kol women of Satna district of Madhya Pradesh.

DATA AND METHODOLOGY

In January 1990, the Regional Medical Research Centre for Tribals in Jabalpur launched a project in Satna district of Madhya Pradesh state, to study the migration characteristics of tribals and its effect on the health of their wives and children. Along with other relevant information, data on fertility was also collected. This study then is based on retrospective data on the fertility performance of a sample of 919 eligible tribal couples consisting of

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442 Kol couples and 477 couples belonging to other tribes such as the Gonds, Mawasis, Khairwars etc. In this study, a couple is defined as 'eligible' if both the partners were living together and the wife's age was less than 50 years on the reference date of the survey, and if they had not used any contraceptive method till that date.

Table 1 presents selected socio-demographic characteristics of the population under study. It is clear from the table that as compared to other tribes of the area, the Kols have a higher sex ratio, lower literacy (8.9 per cent), more poverty and a greater number who are engaged in labour. Compared to the situation in the state, half the Kol population is over 60, the literacy level is less than half that of the state's, and the age at marriage is lower. Also, fewer than ten per cent of the couples have been sterilised. Thus, the population under study is very young, has higher fertility and mortality indices and low acceptability of family planning.

TABLE 1

Selected socio-demographic characteristics of the population under study

Characteristics	Kol tribe	Other tribes	Total
Population	2003	2249	4252
Sex ratio	950.3	938.7	944.2
Literacy (%)	8.9	18.5	14.0
Mean female age at marriage (in years)	13.4	13.5	13.5
Occupation			
Own agriculture	12.4	18.5	15.5
Agriculture labour/labour	74.1*	59.3	66.4
Service/business/household industry	2.3	3.2	2.7
Other	11.2	19.0	15.4
Economic status			
Very low	39.6*	25.6*	32.4
Low	45.3	46.2	45.8
Lower middle	13.9	22.8	18.4
Middle	1.2	5.4	3.4
Average number of live births per eligible couple	2.83	3.12*	2.98
% sterilised couples	9.9	10.8	10.4
Mean age at sterilisation (years)	36.0	36.2	36.1

* $p < 0.05$

The cumulative fertility of females in different age groups has been used as the index of fertility for the purpose of comparison. The average number of children born per eligible woman has been used to indicate how far the

fertility performance of females belonging to one tribal group differs from that of others. An attempt has also been made to correlate age at marriage with the time taken for the first birth. In order to calculate these indices, the eligible couples were classified into seven age groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49. To compute the fecundability at a given age, it was assumed that the population is homogenous with each woman having a constant probability of conception leading to a live birth. Then, assuming that the number of months taken for conception is a geometric distribution, the average number of months taken for a conception is 1/p. This fecundability 'p' of a group of women can be estimated by reverting the average number of months taken to conceive by the group of women.

RESULTS AND DISCUSSION

The results have been discussed in three sections

1. Age specific fertility performance
2. Parity progression probabilities and
3. The time required for the first birth and fecundability

Age specific fertility performance

The average number of children ever born to a Kol woman is observed to be 2.8 as compared to 3.1 for women of other tribes. This variation may be due either to the non-homogeneity of the age distribution of the women or the differing fertility pattern, or to both in different subgroups of the tribal population. It may be mentioned that the age distribution of Kol and non-Kol tribal women does not differ significantly ($x^2=8.1$; d.f. $=6$) and the mean number of children born to Kol and non-Kol women differ significantly ($p < 0.05$). It appears that Kol women have lower fertility as compared to non-Kol tribal women (Figure I).

TABLE 2

Cumulated average number of live births to eligible couples by age of wife

Age of wife (years)	Cumulative average number of children born			
	Satna district		Jabalpur District	
	Kols tribes	Other tribes	Gonds non-tribal	Rural
15	0.00	0.00	0.00	0.00
20	1.30	1.24	0.90	1.10
25	2.46	2.58	2.00	2.10
30	3.38	3.74	3.10	3.20
35	3.94	4.56	3.90	4.10
40	4.38	4.90	4.80	4.90
45	4.56	5.18	5.10	5.50
50	4.66	5.36	5.30	5.90

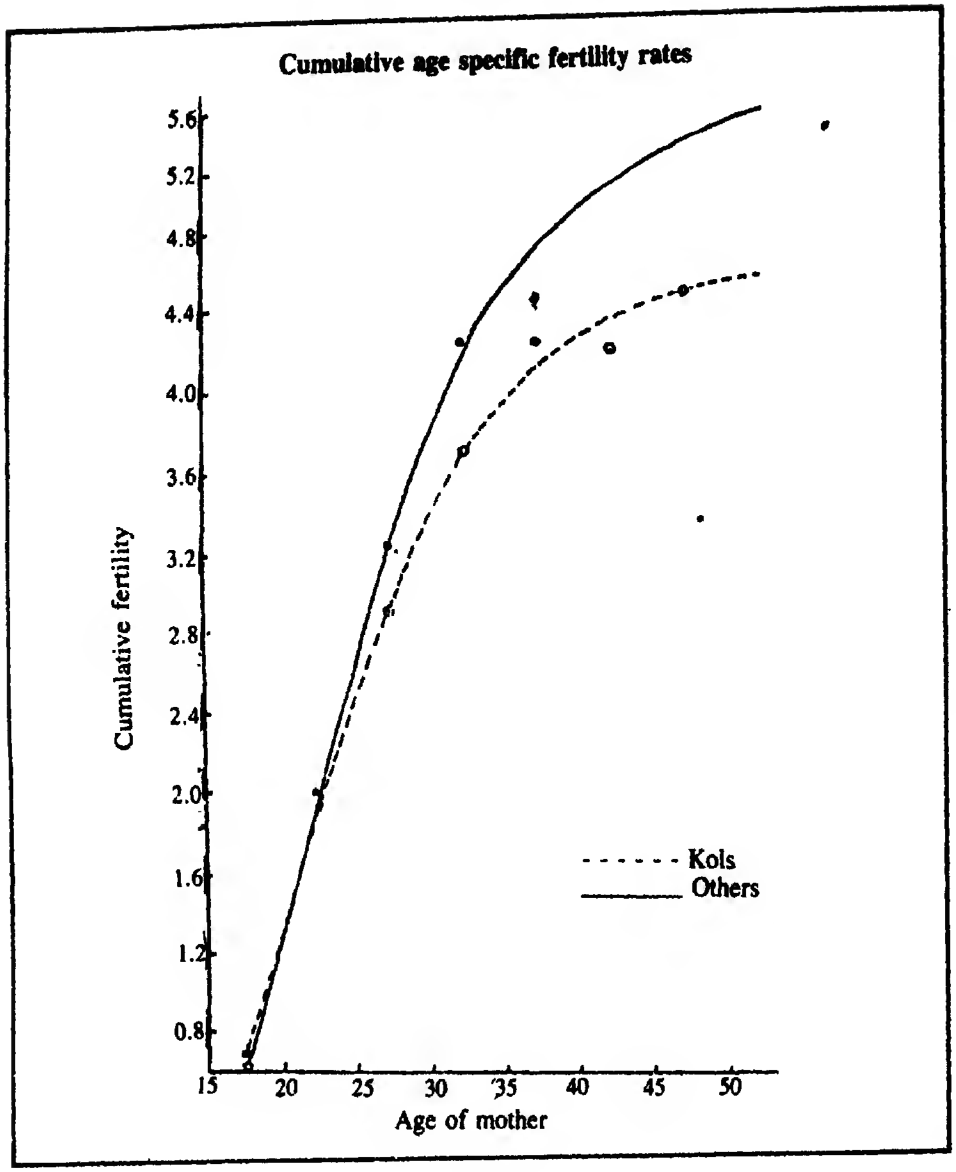

Figure 1

It is clear from Table 2 that the average number of children born to a Kol woman during her reproductive life is lower, that is 4.7, as compared to 5.4 children born to her non-tribal counterparts.

This is true at all ages studied though the differences increase beyond the age of 35. It may be mentioned that the observed fertility of Kol women is also lower than the fertility performance of Gond women and rural women as observed in a study conducted in Kundam Block of Jabalpur[4].

Parity progression probabilities

The cumulative parity progression probabilities are presented in Table 3.

TABLE 3

Cumulative parity progression probabilities

Parity	Kol tribes	Other
0	1.000	1.000
1	0.855	0.860
2	0.660	0.725
3	0.505	0.565
4	0.345	0.405
5	0.205	0.260
6	0.120	0.165
7	0.070	0.105
8	0.026	0.060
9	0.015	0.025
10	0.005	0.024

The probability of an additional birth is comparatively lower among the Kols at each order of birth. It may be pointed out that a non-Kol tribal woman has a 26 per cent chance to have more than four births, whereas this is only about 20 per cent for a Kol woman.

If we compare the difference in probabilities at each order of birth between tribal and non-tribal women, it increases up to the fifth order, and reduces thereafter. However, considering the magnitude of the probabilities at higher orders of birth, it has no significance in terms of fertility performance.

Time taken for first birth and fecundability

Table 4 presents the correlation between age at marriage, age of the mother at the time of first birth, and the monthly probability of conception leading to a live birth (fecundability).

TABLE 4

Age at marriage, age of mother at first birth and monthly probability of conception leading to a live birth

Age at marriage of wife (years)	Satna district				Jabalpur district			
	Mean interval for first conception		Monthly probability of conception		Mean interval for first conception		Monthly probability of conception	
	Kols	Non-Kols	Kols	Non-Kols	Gonds	Rural non-tribal	Gonds	Rural non-tribal
12-13	52.20	50.04	0.01996	01998	37.08	31.32	0.0269	0.6319
14-15	40.80	35.64	0.02451	0.02806	27.72	26.28	0.0361	0.0380
16-17	35.88	33.12	0.02787	0.03019	20.52	21.48	0.0487	0.0465
18-19	33.00	31.44	0.03030	0.03131	15.72	18.36	0.0636	0.0545

The results indicate that Kol women take longer to conceive after marriage as compared to women of other tribes. Since the age at marriage for women belonging to the two tribal groups does not differ considerably, it appears that fecundability is lower among the Kol women. It is also lower than that of tribal Gond women and other rural, non-tribal women under study. It is worth noting that on an average, a Kol women takes 3.5 years to have her first delivery after marriage at the age of 18 years, while it takes 3.4 years for non-Kol women, 2.06 years for Gond women and 2.3 years for rural women. At younger ages, the tribal women of Satna district have almost half the fecundability of Gond women and of rural non-tribal women of Jabalpur district[6]. The reasons for lower fecundability/fertility of Kol women are yet to be investigated. Some presumptions that may be made at present include socio-cultural factors, diseases patterns, and patterns of breastfeeding.

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REFERENCES

1. Pandey, G.D.: "A study of demographic characteristics of Tribals in rural Madhya Pradesh: Some observations for health and family welfare planning". *Indian Journal of Preventive and Social Medicine*, 19(3): 119 (1988).
2. Pandey, G.D., Verma, A., Singh, R.J. and Mathur, Y.N.: "Differentials of age-sex composition in some tribals of rural Madhya Pradesh". In Proceedings of the VI Annual Convention of the Indian Society for Medical Statistics, National Institute of Nutrition, Hyderabad, 1988.
3. Pandey, G.D. and Saxena, B.N.: "District level planning for health and family welfare for tribals", *Demography India*, 17(2): 216 (1988).
4. Pandey, G.D.: "A study of couple fertility in a tribal population of Madhya Pradesh." In *Population Transition in India*, Vol. 2, pp. 216, B.R. Publishing Corporation, Delhi, 1989.
5. Pandey, G.D.: "Fecundability of tribal women in rural Madhya Pradesh." *South Asia Anthropologist*, 10(2): 57 (1989).

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